



Flood Risk Assessment

Alders Farm, Brighton Road,
Hurstpierpoint

May 2022

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Ben Murdoch

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Appendix A – Development Proposals

Summary

Development Description	Existing	Proposed
Development Type	Agricultural Barn Building	Residential Dwelling
EA Vulnerability Classification	Less Vulnerable (Agricultural Building)	More Vulnerable (Residential Dwelling)
Ground Floor Level	Approximately between 37.07m AOD and 37.67m AOD based on 1m LiDAR	Finished Floor Levels (FFLs) to be set no lower than the FFLs in accordance with EA Standing Advice for Minor Developments and change of use
Level of Sleeping Accommodation	N/A	Ground floor of residential dwelling
Impermeable Surface Area	450m ² (Based on provided site plans)	Proposed change of use to the area will not require an extension to the impermeable area
Surface Water Drainage	N/A ¹	As the proposed development is a change of use runoff could be discharged via the existing system. Small scale SuDS such as rainwater planters could be installed in outdoor areas to provide betterment
Site Size	450m ² (Based on provided site plans)	No change
Risk to Development	Summary	Comment
EA Flood Zone	Flood Zone 1	
Flood Source	Pluvial and Fluvial	Unnamed Ditch approximately 13.0m north of the site
SFRA Available	Yes – Mid Sussex District Council Strategic Flood Risk Assessment Level 1 (SFRA) (2015)	
Management Measures	Summary	Comment
Ground floor level above extreme flood levels	N/A ²	300mm above external ground levels to mitigate 1% pluvial event
Safe Access/Egress Route (Surface Water)	N/A ²	If flooding along the main access road occurs and depths are greater than 25cm, refuge should be sought in the property until flood waters recede and rainfall stops.
Flood Resilient Design	Yes	Details of flood proofing/resilience and resistance techniques to be included in accordance with 'Improving the flood performance of new buildings' DCLG (2007)

Site Drainage Plan	N/A ¹	As the proposed project is a change of use runoff could be discharged via the existing system. Small scale SuDS such as rainwater planters could be installed in outdoor areas to provide betterment
Flood Warning & Evacuation Plan	N/A ¹	If flooding along the main access road occurs and depths are greater than 25cm, refuge should be sought in the property until flood waters recede and rainfall stops.
Offsite Impacts	Summary	Comment
Displacement of floodwater	Negligible	Proposal is a change of use which may not result in significant impact on floodplain storage in isolation and accordance with paragraph 047 of the Flood Risk and Coastal Change PPG.
Increase in surface run-off generation	N/A ¹	As the proposed project is a change of use runoff could be discharged via the existing system. Small scale SuDS such as rainwater planters could be installed in outdoor areas to provide betterment
Impact on hydraulic performance of channels	Negligible	No change

¹ not required for this assessment

² data not available.

1. Introduction

- 1.1. Phlorum were commissioned by Ben Murdcoch, to undertake a Flood Risk Assessment (FRA) to facilitate a planning application for the proposed development. This FRA has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance.
- 1.2. This FRA is intended to support a full planning application and as such the level of detail included is commensurate and subject to the nature of the proposals.

Site Overview

- 1.3. The site of the proposed development is Alders Farm, Brighton Road, Hurstpierpoint, Sussex, BN6 9EE (Figure 1). It is understood that the proposed development is for a change of use from an agricultural barn to a residential dwelling as part of a class Q application.

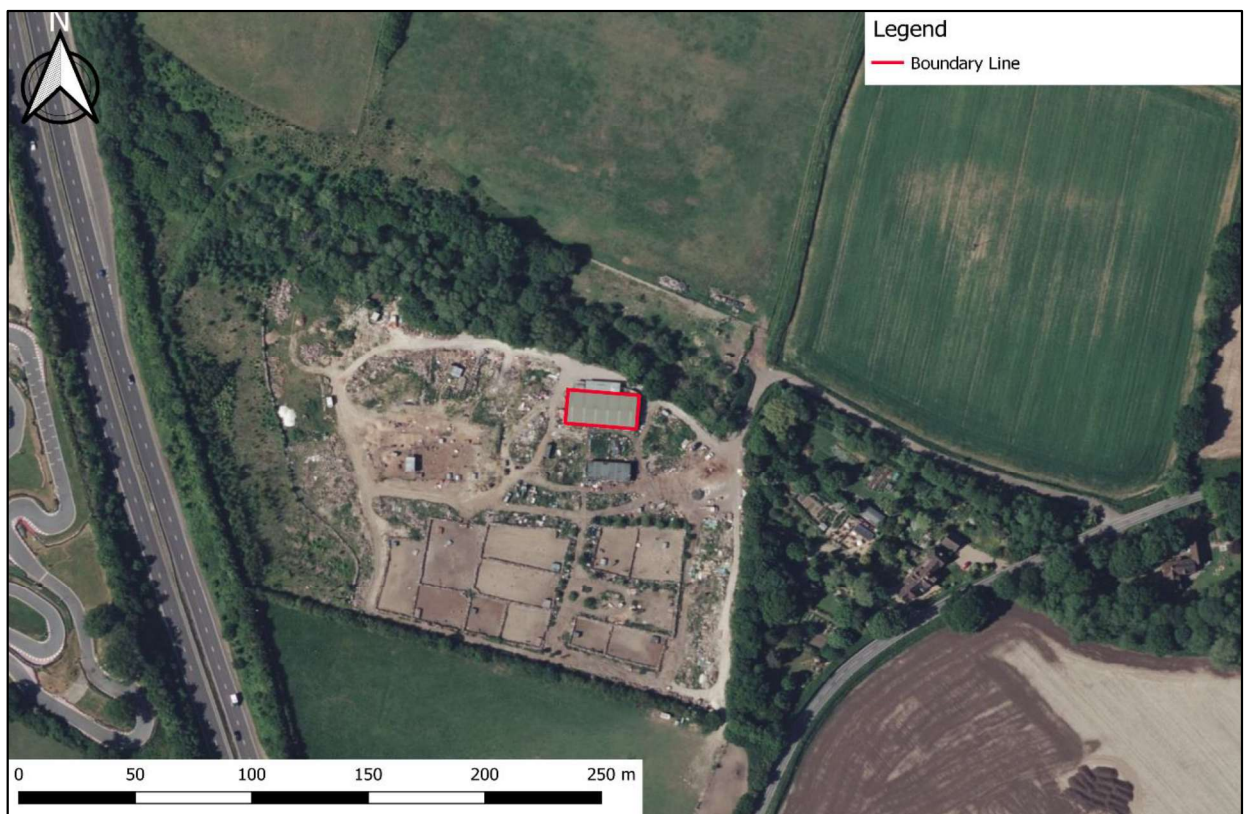


Figure 1: Site Location (Source: Bing Ariel Maps © Contains public sector information licensed under the Open Government License v3.0)

- 1.4. In the absence of a topographical survey, Environment Agency Light Detection and Ranging (LiDAR) data Digital Terrain Model (1m resolution) has been utilised to review the topography of the site (Figure 2). The LiDAR data shows the ground elevation of

the site vary between approximately 37.07 metres Above Ordnance Datum (m AOD) and 37.67m AOD (1m LiDAR data).

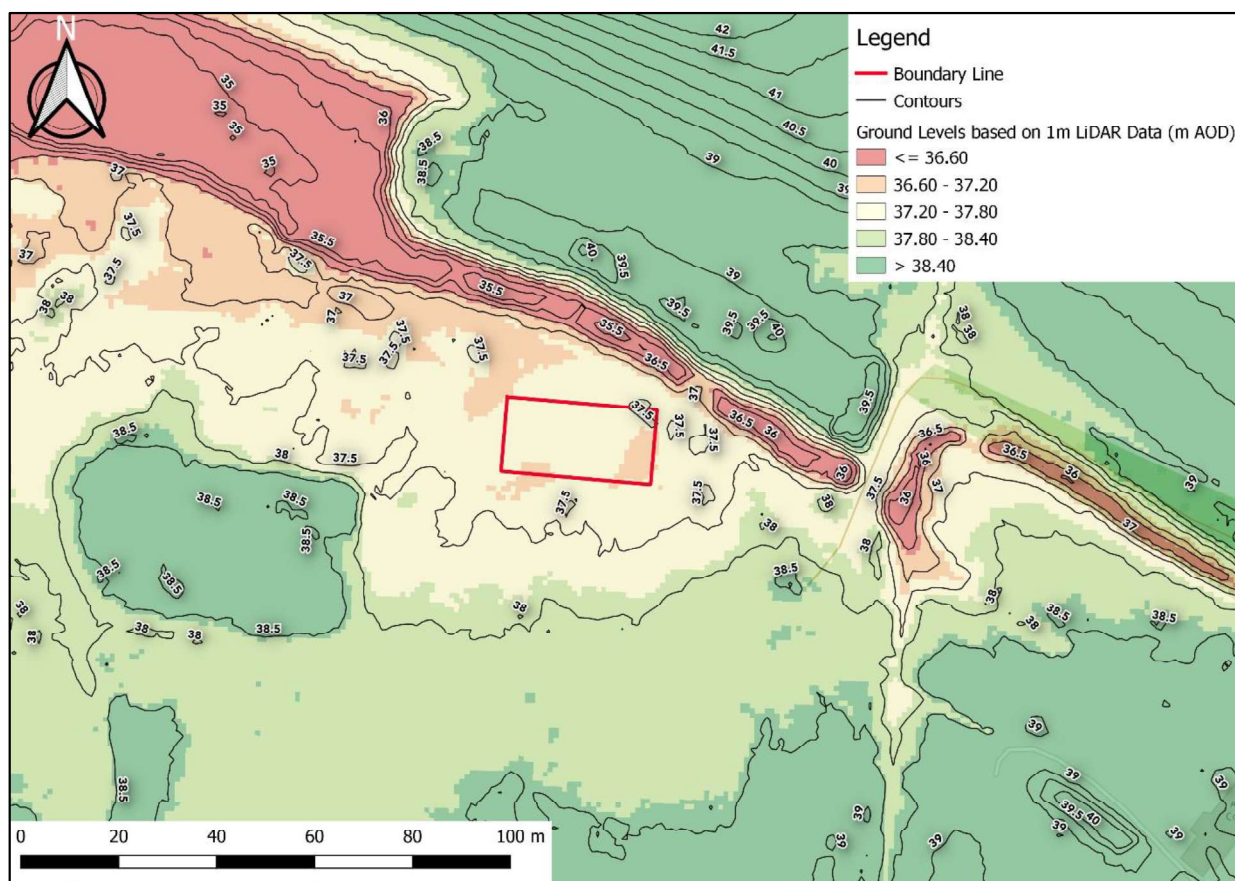


Figure 2: Site Topography (Source: Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA) © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government License v3.0)

- 1.5. Mid Sussex District Council is the Local Planning Authority (LPA) for the site, and West Sussex County Council is the designated Lead Local Flood Authority (LLFA). The site sits within the Environment Agency's Solent and South Downs region.

Planning Policy and Guidance

1.6. UK government planning guidance states¹ that an FRA is required for sites which are:

- *In Flood Zone 2 or 3 including minor development and change of use,*
- *More than 1 hectare in Flood Zone 1,*
- *Less than 1 ha in Flood Zone 1, including a change of use in development type to a more vulnerable class (for example from commercial to residential), where they could be affected by sources of flooding other than river and the sea (for example surface water drains or reservoirs),*
- *In an area within Flood Zone 1 which has critical drainage problems as notified by the Environment Agency.*

1.7. The site is located within Flood Zone 1. If it is on land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use then according to NPPF Footnote 55 an FRA is required.

1.8. The objective of this FRA is to demonstrate that the proposals are acceptable in terms of flood risk. This report summarises the findings of the study and specifically addresses the following issues in the context of the current legislative regime:

- Fluvial flood risk;
- Surface water flood risk; and
- Risk of flooding from other sources.

¹ <https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications#when-you-need-an-assessment>

2. National Planning Policy Framework

- 2.1 The potential consequences of inappropriate development in a flood risk area for occupiers, either of the development or elsewhere, pose significant risks in terms of personal safety and damage to property. The approach taken in the assessment of flood risk at the planning stage is set out in national, regional, and local planning policy and associated guidance. The following section summarises the key policies and guidance relevant to the proposed development.
- 2.2 The National Planning Policy Framework² (NPPF) (DCLG, 2021) includes Government policy on development and flood risk stating that:

“159. Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.

167. When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

- a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;*
- b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;*
- c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;*
- d) any residual risk can be safely managed; and*
- e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.*

168. Applications for some minor development and changes of use should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 55.”

- 2.3 Footnote 55 of the NPPF states:

“A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other

² <https://www.gov.uk/guidance/national-planning-policy-framework>, last updated July 2021

sources of flooding, where its development would introduce a more vulnerable use.”

- 2.4 Consultation has been undertaken with Mid-Sussex District Council who have referred to national policy that outlines a FRA for this Site / development is required;

“The barn proposed to be converted into a residential dwelling is located approximately 10m to the south of an Ordinary Watercourse (ditch located north of the access road). The barn is located within the 1 in 100/year and 1 in 1,000/year surface water flood extents (labelled medium and low risk respectively on Environment Agency surface water flood maps).

We would advise that a Flood Risk Assessment (FRA) is required for this development. This is based on the Environment Agency’s requirement which states a FRA is required for all development that increases the vulnerability classification and is in Flood Zone 1 where the LPA’s Strategic Flood Risk Assessment shows it as at risk from other sources of flooding (<https://www.gov.uk/guidance/flood-risk-assessment-standing-advice>).

The Mid Sussex District Council SFRA utilises the Environment Agency’s flood maps within it’s report and as such the site will be shown to be at risk of flooding from other sources. We would advise that the FRA should follow the ‘Environment Agency’s standing advice for vulnerable developments”.

- 2.5 Flood Zones in England are defined in Table 1³ as follows:

Table 1 - Flood Zone Definitions

Flood Zone	Definition
Zone 1 Low Probability	Land having less than 1 in 1,000 annual probability of river or sea flooding (all land outside Zones 2 and 3).
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding.
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

- 2.6 An FRA should be appropriate to the scale, nature and location of the development and should identify and assess the risk from all sources of flooding to and from the development and demonstrate how any flood risks will be managed over the lifetime of the development.

³ <https://www.gov.uk/guidance/flood-risk-and-coastal-change>

- 2.7 An assessment of any hydrological impacts should be assessed including an assessment of impacts on surface water runoff and impacts to the drainage network to demonstrate how flood risk to others will be managed following development and taking climate change into account.
- 2.8 The Planning Practice Guidance (substantially revised in March 2015 in relation to drainage) requires that sustainable drainage systems should be considered and included where practicable, in line with DEFRA Technical Standards⁴.

Mid Sussex District Plan

- 2.9 The District Plan prepared by the Local Planning Authority, Mid Sussex District Council⁵, sets out the policies for development in the local area. The plan states the following policy on flood risk and drainage;

'DP41: Flood Risk and Drainage

Strategic Objectives: 1) To promote development that makes the best use of resources and increases the sustainability of communities within Mid Sussex, and its ability to adapt to climate change; and 2) To support sustainable communities which are safe, healthy and inclusive.

Evidence Base: Gatwick Sub Region Water Cycle Study; Strategic Flood Risk Assessment; Water. People. Places SuDS guidance.

Proposals for development will need to follow a sequential risk-based approach, ensure development is safe across its lifetime and not increase the risk of flooding elsewhere. The District Council's Strategic Flood Risk Assessment (SFRA) should be used to identify areas at present and future flood risk from a range of sources including fluvial (rivers and streams), surface water (pluvial), groundwater, infrastructure and reservoirs.

Particular attention will be paid to those areas of the District that have experienced flooding in the past and proposals for development should seek to reduce the risk of flooding by achieving a reduction from existing run-off rates.

Sustainable Drainage Systems (SuDS) should be implemented in all new developments of 10 dwellings or more, or equivalent non-residential or mixed development²² unless demonstrated to be inappropriate, to avoid any increase in flood risk and protect surface and ground water quality. Arrangements for the long term maintenance and management of SuDS should also be identified.

For the redevelopment of brownfield sites, any surface water draining to the foul sewer must be disconnected and managed through SuDS following the remediation of any previously contaminated land.

⁴ Technical Standards Accessed Online

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/415773/sustainable-drainage-technical-standards.pdf

⁵ Mid Sussex District Plan - <https://www.midsussex.gov.uk/media/3406/mid-sussex-district-plan.pdf>

SuDS should be sensitively designed and located to promote improved biodiversity, an enhanced landscape and good quality spaces that improve public amenities in the area, where possible.

The preferred hierarchy of managing surface water drainage from any development is:

1. Infiltration Measures

2. Attenuation and discharge to watercourses; and if these cannot be met,

3. Discharge to surface water only sewers.

Land that is considered to be required for current and future flood management will be safeguarded from development and proposals will have regard to relevant flood risk plans and strategies.'

Sequential and Exception Tests

- 2.10 The Sequential and Exception Tests are applied in specific cases defined by UK Government policy. Their purpose is to drive development to areas of low flood risk and to support developments which improve flood risk for developments in areas at risk of flooding.

Sequential Test

- 2.11 Under the NPPF all new planning applications should undergo a Sequential Test unless a minor household development or a change of use application in accordance with paragraph 168 and footnotes 55 and 56. This test should be implemented by local planning authorities with a view to location particularly vulnerable new developments outside of the flood plain.
- 2.12 Paragraph 168 of the 2021 NPPF states that:

*'168. Applications for some minor development and **changes of use** should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 55.'*

- 2.13 Therefore, in accordance with Paragraph 168 and footnotes 55 and 56 of the NPPF, the proposed development is classified as a change of use and should not be subject to the sequential or exception tests but should still meet the requirement for the site-specific flood risk assessments.

Exception Test

- 2.14 The Flood Risk Vulnerability Classification table⁶, provided below in Table 2 shows which vulnerabilities are appropriate in each Flood Zone.
- 2.15 The proposed development sits wholly within Flood Zone 2 and the proposed change of use is from "less vulnerable" to "more vulnerable". Table 2 shows Flood Zone 2 is an appropriate location for "more vulnerable" uses without the need for an Exception Test.

⁶

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/575184/Table_3_-_Flood_risk_vulnerability_and_flood_zone_compatibility.pdf

Table 2: Flood Risk Vulnerability Classification Table

Flood Zones	Flood Risk Vulnerability Classification				
	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a	Exception Test required	x	Exception Test required	✓	✓
Zone 3b	Exception Test required	x	x	x	✓

Summary

- 2.16 This flood risk assessment has been prepared with due consideration to the above local and national policy.

3. Consultation and Review

Sources of Information

Consultation

- 3.1 The site is within the remit of West Sussex County Council as Lead Local Flood Authority (LLFA). Consultation has been undertaken with West Sussex County Council and the EA Solent and South Downs region (May 2022) to obtain flood levels for the site. Responses to these consultations are outstanding at time of writing.
- 3.2 These will be included within Appendix B upon receipt.

Documents

- 3.3 Local Governments and Lead Local Flood Authorities provide documents which contain data and policies on flood risk and new development in their areas. These documents are introduced and briefly summarised below. For the purposes of this FRA, these documents have been reviewed for relevant information and any relevant data is discussed within the appropriate sub heading of this report.
- 3.4 The following sources of information have been reviewed for this assessment:
- The Interactive Flood Risk Mapping available on the Environment Agency (EA) website⁷.
 - The National Planning Policy Framework (NPPF) technical guide (Communities and Local Government, 2019).
 - British Geological Survey - Geology of Britain Viewer (British Geological Society, 2017).
 - Mid Sussex District Council Local Plan⁸ (2018).
 - Mid Sussex District Council Strategic Flood Risk Assessment⁹ (SFRA) (2015).
 - West Sussex LLFA Policy for the Management of Surface Water¹⁰ (2018)
 - West Sussex LLFA Culvert Policy¹¹ (2018)

⁷ Environment Agency, Flood Map for Planning, <https://flood-map-for-planning.service.gov.uk/>, 2017

⁸ **Mid Sussex District Council, Local Plan 2014-2031, 2018**

⁹ **Mid Sussex District Council Strategic Flood Risk Assessment, 2015 -**
<https://www.midsussex.gov.uk/media/2609/strategic-flood-risk-assessment.pdf>

¹⁰ West Sussex LLFA Policy for the Management of Surface Water -
https://www.westsussex.gov.uk/media/12230/ws_llfa_policy_for_management_of_surface_water.pdf

¹¹ West Sussex LLFA Culvert Policy -
https://www.westsussex.gov.uk/media/10342/llfa_culvert_policy.pdf

West Sussex LLFA Policy for the Management of Surface Water

- 3.5 The LLFA is required to provide consultation responses on the surface water drainage provisions associated with major developments. The policy statement sets out the requirements that the LLFA has for drainage strategies and surface water management provisions associated with applications for development.
- 3.6 For all developments, even small, the LLFA would expect the principles of this policy & drainage strategy to be considered. For all major developments, we would expect adherence to the full scope of this policy; the drainage strategy is to consider the topics set out in the table below and be consistent with the Sustainable Drainage Systems (SuDS) policies in of the document.

Strategic Flood Risk Assessment (SFRA)

- 3.7 The SFRA, adopted in 2015, provides the evidence base for the Local Planning Authority Mid Sussex District Council Local Plan and guidance for consideration when determining planning applications. The SFRA seeks to place new development into areas of lower flood risk, taking into account current flood risk, future flood risk and the effect a proposed development would have on the risk of flooding.
- 3.8 The SFRA online mapping provided by Mid Sussex District Council has been used throughout production of this report as a source of information, particularly pertaining to historic flood incidents.

4. Sources of Flood Risk

Fluvial Flood Risk

Main Rivers and Ordinary Watercourses

- 4.1 There are no main rivers in the vicinity of the site. The site is within 13.0m of an Ordinary Watercourse, referred to within this report as Unnamed Ditch.
- 4.2 As the site is within 20m of the proposed development site, it was necessary to consult the LLFA to determine whether any further policy existed on conducting works at this distance to the watercourse.
- 4.3 The West Sussex LLFA directed this enquiry to their West Sussex Culvert Policy which sets out good practice and design principles whose works concern the possible alteration of an existing watercourse.
- 4.4 Section 7.0 of the Culvert Policy states the following:

7.0 Planning Application and Building Control Considerations

- *The requirement for ordinary watercourse land drainage consent is independent of the need for planning permission and the granting of planning permission does not imply or guarantee that Land Drainage consent will be granted.*
- *Consideration must be given to any relevant planning conditions.*
- ***Buildings and structure must not be sited within 5 metres from the outer edge of new or existing culverts/ watercourses.***
- *Any works must comply with the local council land drainage byelaws, if present.*

- 4.5 As the proposed site is approximately 13.0m from the existing watercourse, this is beyond the 5m limit as stated above and therefore the proposed site within an area which is acceptable for planning.

Flood Map for Planning

- 4.6 Flooding from watercourses arises when flows exceed the capacity of the channel, or where a restrictive structure is encountered, resulting in water overtopping the banks into the floodplain.
- 4.7 The proposed site lies wholly within Flood Zone 1 (Figure 3) which is defined as, land having less than 1 in 1,000 annual probability of river or sea flooding (all land outside Zones 2 and 3).

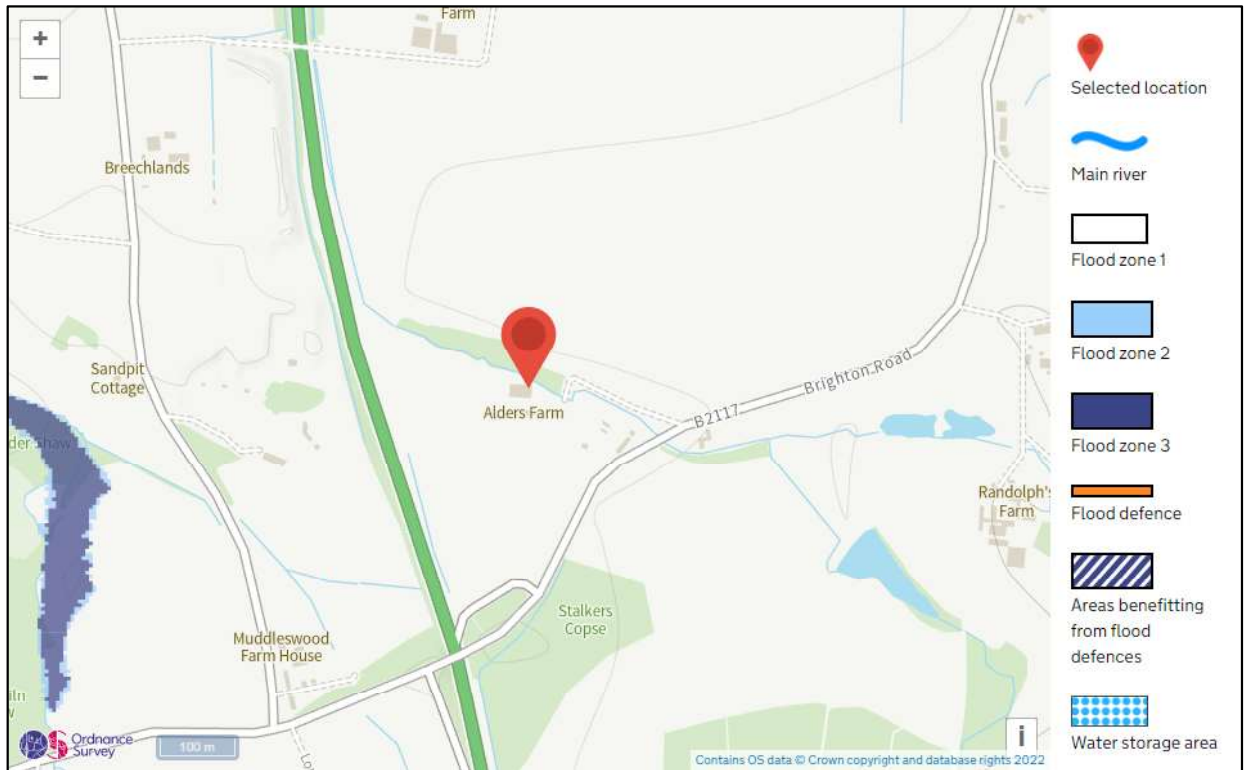


Figure 3: EA Flood Mapping for Planning

- 4.8 The Unnamed Ditch is not represented with the Flood Map for Planning. This is not to say it does not pose a risk, rather no information is available to inform Flood Zones within this location. In the absence of Flood Zones, it is appropriate to review the EA's surface water flood risk map which can provide an indicative floodplain associated with this feature. This is summarised within the 'Pluvial Flood Risk' section of this report.

Climate Change

- 4.9 The site is located within the London Management Catchment, which has updated central peak flow river allowances of: 16% for the 2020s, 18% for the 2050s, and 37% for the 2080s. As the development is an extension to the residential property, the peak flow allowance of 37% for the 2080s would be required for fluvial flood flows.
- 4.10 As the Unnamed Ditch is not represented within the Flood Map for Planning, it suggests that there is no hydraulic model to which the allowances should be applied. It is therefore recommended mitigation measures are incorporated to mitigate the residual risk posed by climate change. These are summarised within the 'Flood Risk Mitigation' section of this report.

Historic Flooding

- 4.11 Our review of Recorded and Historical Flood Outlines shows that the site is outside of any past historical flood events. With the nearest recorded event occurring in 1976 2.1km east of the proposed site. It is therefore unlikely that this event would have any implication on the proposed site.

Pluvial Flood Risk

- 4.12 Pluvial flooding can occur during prolonged or intense storm events when the infiltration potential of soils, or the capacity of drainage infrastructure is overwhelmed leading to the accumulation of surface water and the generation of overland flow routes.
- 4.13 The EA's surface water flood risk map has been reviewed to inform the pluvial risk to the site, and to determine an indicative floodplain associated with the Unnamed Ditch to the north of the site.
- 4.14 The EA surface water flood risk mapping (Figure 4) for the 3.3% (high risk), 1% (medium risk) and 0.1% (low risk) AEP flood events shows that the site is at **medium to high risk**. The site remains unaffected in the high risk (3.3% AEP) event (Figure 5).
- 4.15 Analysis the medium (1.0% AEP) (Figure 6) and low (0.1%) (Figure 7) risk events the site is affected by surface water flooding, with anticipated flood depths of up to 150mm and 600mm respectively.
- 4.16 Analysis of the 1 in 100 year event (medium risk) has demonstrated flood depths to be below 300mm, however it is recommended that all finished floor levels are set 300mm greater than external site levels.
- 4.17 Each of the medium and low risk events also have a corresponding hazard rating which is also shown on each of the figures, this information has been assessed to review the access and egress from the Site. For the medium event the proposed dwelling is partially impacted by a 0.75 to 1.25 hazard rating - danger for some. The wider site is demonstrated to not be affected however the main access road to the Site off of Brighton Road, is demonstrated to be Danger for most and Danger for All. As the flood source at this location is pluvial/rainfall, it is recommended that if flooding occurs on the road and depths exceed 25cm. Refuge should be sought in the property until the flooding on the access off of Brighton Road and rainfall/storm event has stopped.
- 4.18 For the low-risk event, the corresponding hazard rating is given as 1.25-2.00 which is defined as a significant hazard, danger for most, which shown to partially affect the property as part of the overland flow route. and could therefore impact on access/egress of the dwelling. It is recommended that if flooding occurs on the road and depths exceed 25cm. Refuge should be sought in the property until the flooding on the access off of Brighton Road and rainfall/storm event has stopped.

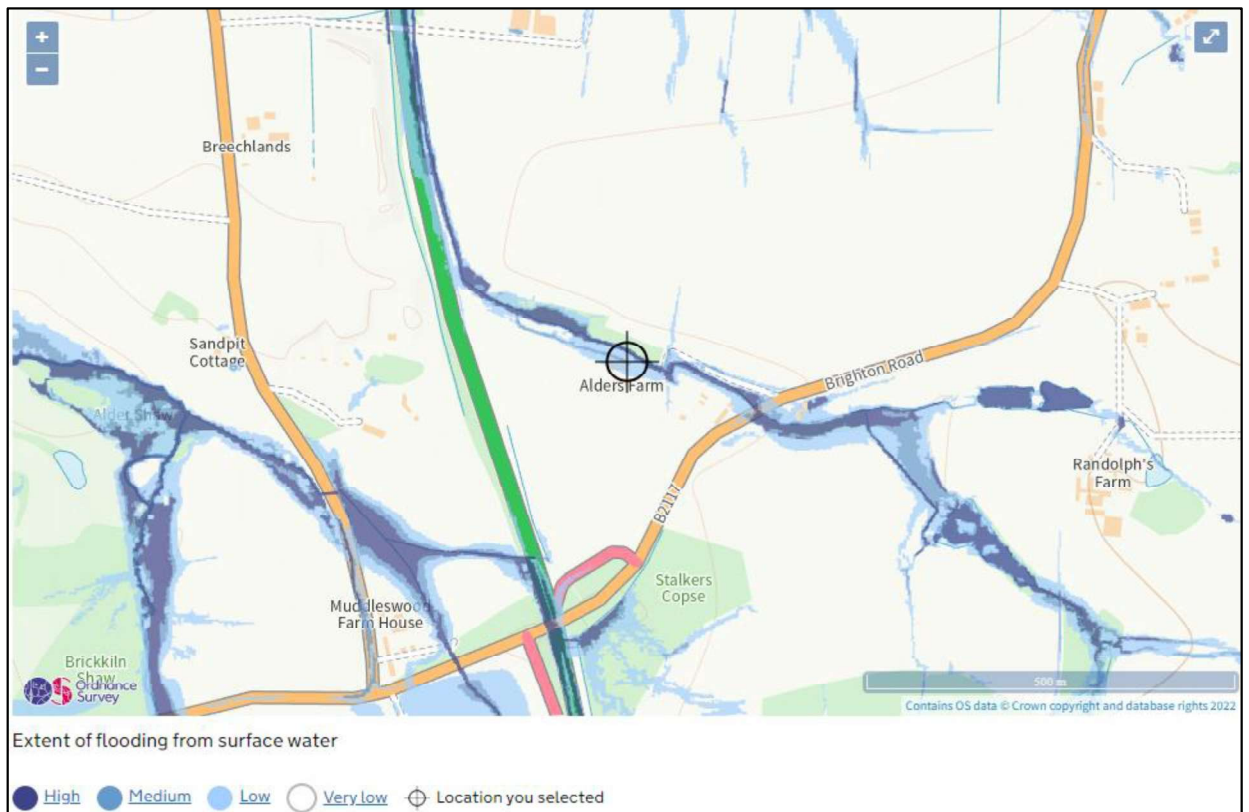


Figure 4: EA Surface Water Flood Risk Mapping

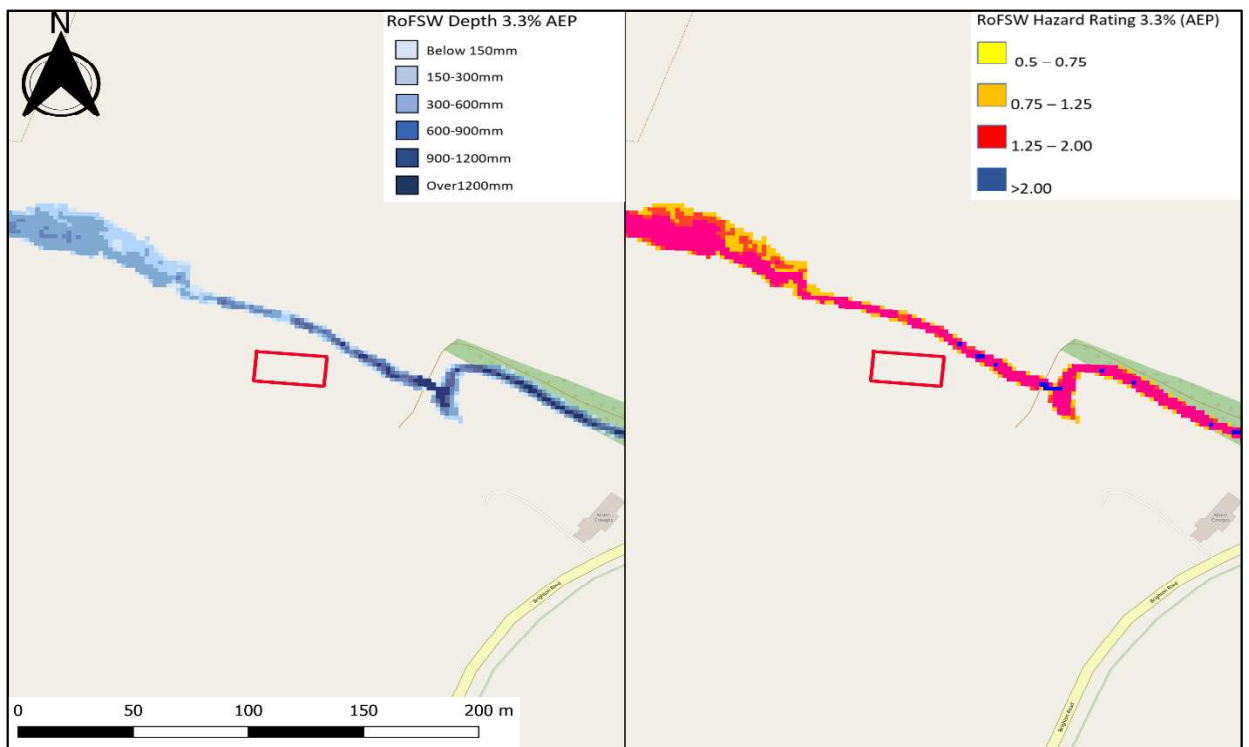


Figure 5 EA Surface Water Flood Risk Mapping 3.3% AEP (Source: Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors, © EA copyright and/or database right 2015)

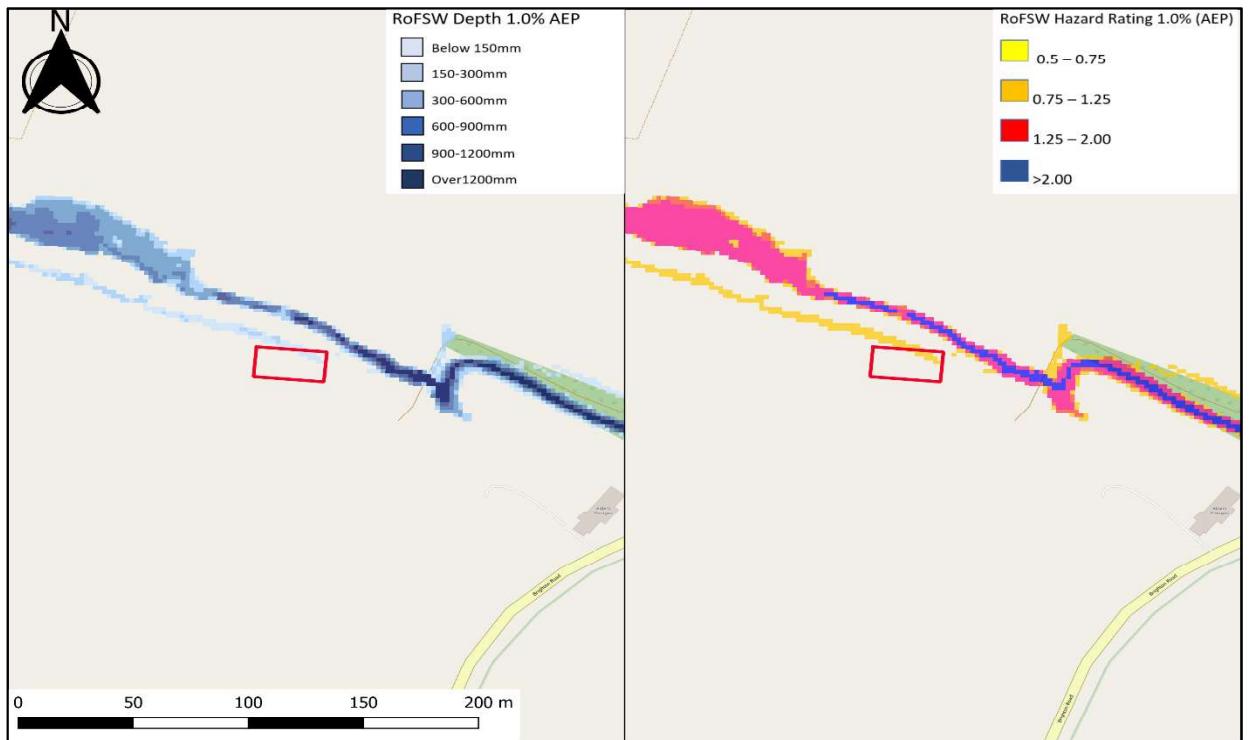


Figure 6 EA Surface Water Flood Risk Mapping 1.0% AEP (Source: Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors, © EA copyright and/or database right 2015)

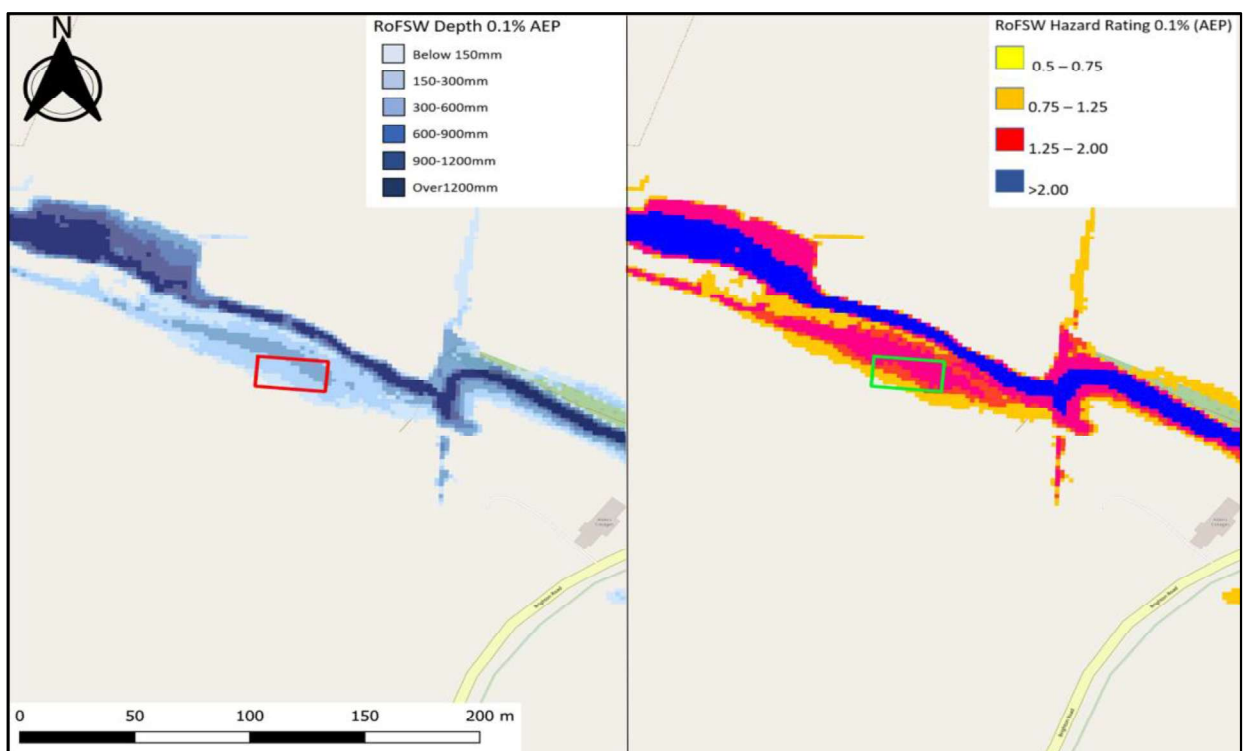


Figure 7 EA Surface Water Flood Risk Mapping 0.1% AEP (Source: Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors, © EA copyright and/or database right 2015)

- 4.19 The publicly available SFRA does not include any mapping to show areas which are susceptible to surface water flooding but does include the following remarks on surface water flooding:

'The Environment Agency's Risk of Flooding from Surface Water mapping shows the approximate areas at risk of flooding based on ground levels and drainage. Locations at high risk of surface water flooding (annual probability greater than 1 in 30) are particularly notable south of Staplefield and around Hickstead, Twineham and Twineham Green.

Catchment Flood Management Plans have identified the main urban areas of Burgess Hill, East Grinstead and Haywards Heath as having the potential for surface water flood risk. Historical flood events have also occurred in the Low Weald caused by surface water run-off from the South Downs, particularly at times of high groundwater levels.'

- 4.20 Hurstpierpoint is not one of the locations stated at being at risk of surface water flooding.
- 4.21 As the surface water flood risk extents are associated with the Unnamed Ditch to the north of the site, it is considered that the site is not truly at risk from pluvial flooding, rather fluvial flooding associated with the watercourse.

Reservoirs

- 4.22 Flooding can occur from large waterbodies or reservoirs if they are impounded above the surrounding ground levels or are used to retain water in times of flood. Although unlikely, reservoirs and large waterbodies could overtop or breach leading to rapid inundation of the downstream floodplain.
- 4.23 According to EA flood risk from reservoirs mapping the site is outside flood extents in the event of reservoir flooding.

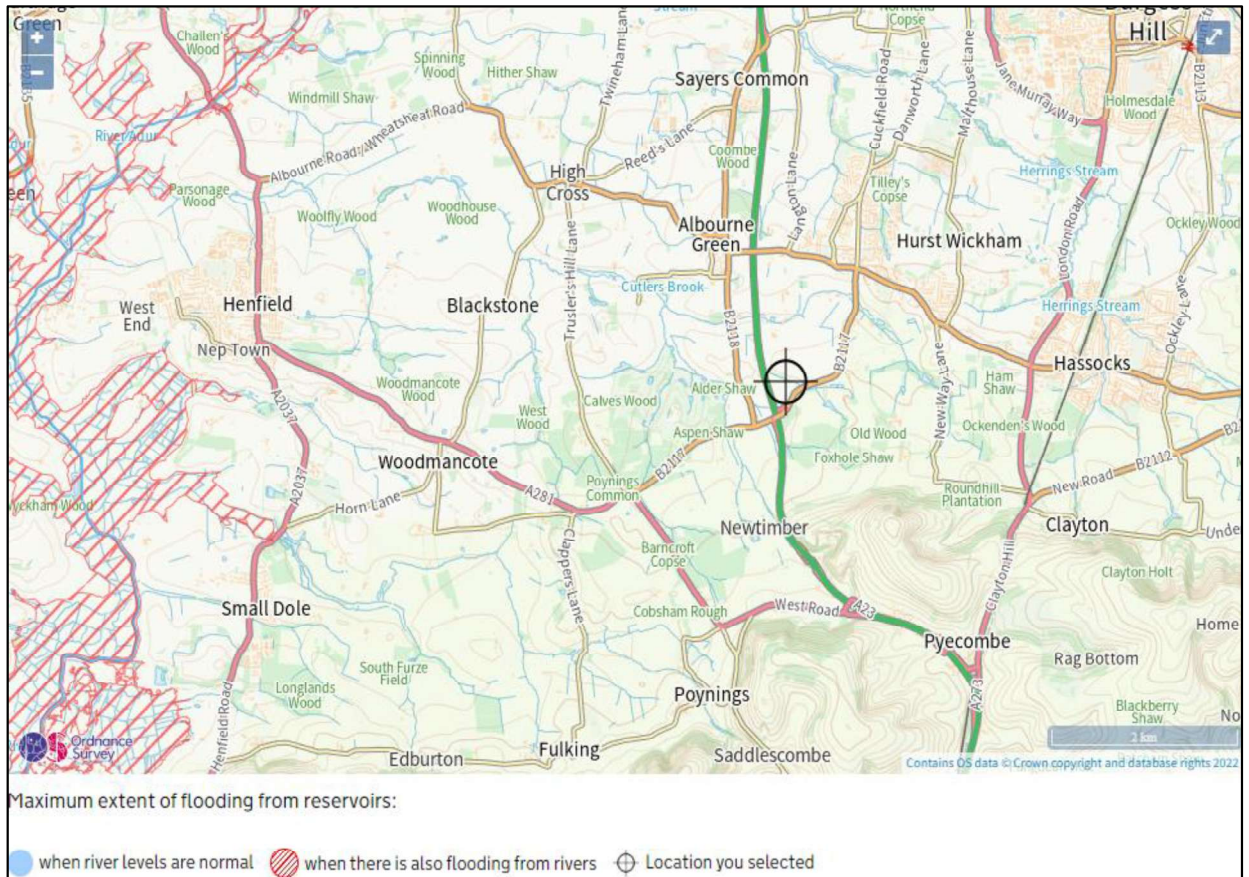


Figure 8: EA Reservoir Flood Risk Mapping

- 4.24 The site has not been flagged as being at risk of flooding following a reservoir failure.

Groundwater

- 4.25 Groundwater flooding occurs in areas where underlying geology is permeable, and water can rise within the strata sufficiently to breach the surface.
- 4.26 The British Geological Survey's (BGS) mapping shows superficial deposits of Head comprising clay, sand, silt, and gravel underlying the site. The bedrock underlying the site is Folkestone Formation comprising Sandstone.
- 4.27 Historic BGS borehole (ref: TQ21NE54) 200m south-west of the site confirm that the site is underlain by clay, sand, silt and gravel. This suggests water would not be able to reach the surface, but the gravel/sand strata may possess perched water. Water was identified as being struck at around 2.05m below ground level.
- 4.28 The superficial deposits formation is a principal aquifer (Source EA; Magic Map online resource). Principal and secondary aquifers provide significant quantities of drinking water, and water for business needs. They may also support rivers, lakes and wetlands. The bedrock aquifer is defined as a Secondary (undifferentiated) aquifer. Secondary undifferentiated are aquifers where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type. These have only a minor value.

- 4.29 The publicly available SFRA does not presents any mapping relating to the Susceptible to Groundwater Flooding. However, the SFRA does address this risk within the report and states the following;

*'Groundwater flooding is seen as a characteristic of low-lying areas that are underlain by aquifers. Large parts of the district are underlain by aquifers, particularly the chalk aquifers in the southern part of the district and the sandstone aquifers in the High Weald area of the district. Parts of the district 47 where these aquifers lie are also low-lying. This includes part of the southern area of the district, particularly Hassocks, **Hurstpierpoint** and Sayers Common.*

The District Council sought to obtain data on where flooding from high groundwater levels had occurred from Town and Parish Council's, the Environment Agency and the District Council's own Drainage Team. Only a limited number of historical flood records, where the cause had been documented as groundwater flooding, were obtained. It is possible that some of the records of flooding, where the cause was recorded as overland flow, may have been in part caused by water levels in the ground rising above surface elevations however it has not been possible to determine if this is the case with any certainty.'

- 4.30 The proposed site is within the Hurstpierpoint area which has been identified as an area which could characteristically see groundwater flooding. Although, as stated there is little evidence to support that this has ever happened in this area beforehand.
- 4.31 Given that fact, and also the point that the proposed development does not include the creation of a basement or any change to the fabric or foundations of the existing building, the risk from groundwater flooding is considered low.

Sewer Flooding

- 4.32 Surface water sewers can be a cause of flooding where the drainage network has become overwhelmed, either by blockage or due to local development beyond the designed capabilities of the drainage system.
- 4.33 The publicly available SFRA does not presents any mapping relating to the susceptible to sewer Flooding. However, the SFRA does address this risk within the report and states the following:

'Following consultation with the Environment Agency it was decided that using the historical data would be the best form of data to use for the SFRA (the Agency considered that the time and costs associated with detailed modelling would not add sufficient benefit 48 to the SFRA). Following a request for updated flood incident data, Southern Water provided up to date on 22nd May 2015.

Whilst a number of incidents have been identified across the district there are currently no specific locations where a bespoke policy should be applied but planning applications at locations affected by or adjacent to recorded historical incidents should demonstrate whether issues have been or can be resolved.

In total there are 24 town and parish councils within Mid Sussex, all of which were written to. In response, the District Council received information on previously unidentified historical flood incidents in Ardingly, Balcombe, Hassocks, Lindfield Rural and West Hoathly.

Not all town and parish councils responded to the request for flood event/risk information and therefore the SFRA is perhaps not as extensive as it could be. However, a lack of response may indicate a lack of historic flooding incidents in those towns and parishes.'

- 4.34 From this information it is understood that the records kept on flooding from sewers is limited for the area which could be evidence that not many flood events from this cause have happened. The town and parish councils who provided records of sewer flooding did not include Hurstpierpoint.
- 4.35 The development is therefore considered to be at low risk of flooding from sewers.

5. Flood Risk Mitigation

Fluvial / Pluvial

- 5.1 The site is shown to be affected by the 1.0% and 0.1% AEP events, with depths reaching up to 600mm for the 0.1% AEP event. This is associated with the Unnamed Ditch located to the north of the site.
- 5.2 The proposal is for the change of use of an existing agricultural barn, it should be considered a Minor Development and adhere to the EA Standing Advice for Minor Developments.
- 5.3 The Finished Floor Levels (FFLs) of the proposed extension will be set 300mm above external ground levels. To mitigate the 1 in 100 year surface water event, depths have been shown to be less than 300mm.
- 5.4 Furthermore, the flood resilience measures should be incorporated in accordance with the CLG Report, Improving the Flood Performance of New Buildings - Flood Resilient Construction (2007) including measures such as the below:

- *Raised wiring and power outlets at ground level.*
- *Units to be raised on legs above plinth.*
- *Finished internal floor levels to be raised 300mm above external ground levels*
- *Solid construction to be used at ground floor.*
- *Waterproof plasterboard used at ground floor.*
- *Air brick covers to be installed.*
- *Non-return valves should be installed on all new drainage.*
- *All new plumbing insulation to be of closed cell design.*
- *Patio doors where and if proposed, may be susceptible to ingress of flood water. Any PVC window/door sills should be adequately sealed. Double glazing should be used to provide resistance against external flood water pressure. Of concern would be excessive water pressure on the glazing of patio doors.*
- *Finish shall be water resistant render with lime-based plaster finish, hydraulic lime coating or ceramic tiles. Plasterboard placed horizontally as a sacrificial material, not vertically.*
- *Insulation to be low adsorption board or semi rigid self-draining wool bats.*
- *Load bearing walls to be masonry not timber.*

Reservoirs, Groundwater and Sewers

- 5.5 Flood risk from other sources is deemed to be low, therefore no specific mitigation recommended above those discussed above for tidal flooding.

Increase to Flood Risk Elsewhere

5.6 The proposed development is for the change of use of an existing agricultural building on site. As such, the proposal constitutes a Minor Development under the NPPF.

5.7 Paragraph 047 of the Flood Risk and Coastal Change Planning Practice Guidance (PPG) states:

Minor developments are unlikely to raise significant flood risk issues unless:

- *they would have an adverse effect on a watercourse, floodplain or its flood defences;*
- *they would impede access to flood defence and management facilities, or;*
- *where the cumulative impact of such developments would have a significant effect on local flood storage capacity or flood flows.*

5.8 As such, the proposed development in isolation should have a negligible impact on flood risk elsewhere.

6. Conclusions

- 6.1 This FRA has been undertaken with reference to the requirements of NPPF and Planning Practice Guidance with respect to the development at Alders Farm, Brighton Road, Hurstpierpoint, Sussex, BN6 9EE. It has been written to support a planning application and has been prepared with due consideration to the nature of the proposed development to provide the appropriate level of detail.
- 6.2 The FRA supports the planning application and demonstrates that there is an acceptable level of flood risk to the site if the mitigation strategies recommended are implemented in the scheme. The development does not increase flood risk off site or to the wider area.

Source of Flooding	Flood Risk Summary
Fluvial Pluvial	The site is located within Flood Zone 1, however the Unnamed Ditch to the north of the site isn't represented within the Flood Map for Planning. The EA's surface water flood risk maps were utilised to provide an indicative floodplain associated with this feature. The site is shown to be affected by the 1.0% and 0.1% AEP events and consequently at medium risk of pluvial flooding with depths below 300mm where the building is to be converted. Depths could be as great as 600mm for the low risk event. However, the proposal is for a change of use of an existing agricultural building, and it would be considered a Minor Development and adhere to the EA Standing Advice for such. The FFLs of the proposed extension should be raised 300mm above external ground levels to mitigate the 1% event.
Reservoirs	The site is considered to be at low risk from reservoir flooding.
Groundwater	The site is considered to be at low risk from groundwater flooding.
Sewers	The site is considered to be at low risk from sewer flooding.

- 6.3 The following conclusions can be drawn from this level 1 FRA:
- This FRA has identified no prohibitive constraints in developing the proposed site for the proposed usage.
 - FFLs of the proposed extension should be raised 300mm above external ground levels to mitigate the 1% event.
 - The site is shown to be at medium pluvial risk and should include flood resilience measures should be incorporated in accordance with the CLG Report, Improving the Flood Performance of New Buildings - Flood Resilient Construction (2007)
 - The site is at low risk from all other sources (fluvial, tidal, groundwater, reservoir and sewer).

- 6.4 This Flood Risk Assessment should be submitted as part of the planning application to satisfy the requirements under NPPF.

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