

FloodSmart Plus



Flood Risk Assessment

Site Address

Bramshill Road
Heckfield, Hart
Hampshire
Southeast England
England
RG27 0LA

Date of Update

2023-11-29

Report Date

2021-11-24

Report Status

FINAL

Grid Reference

473897, 160892

Site Area

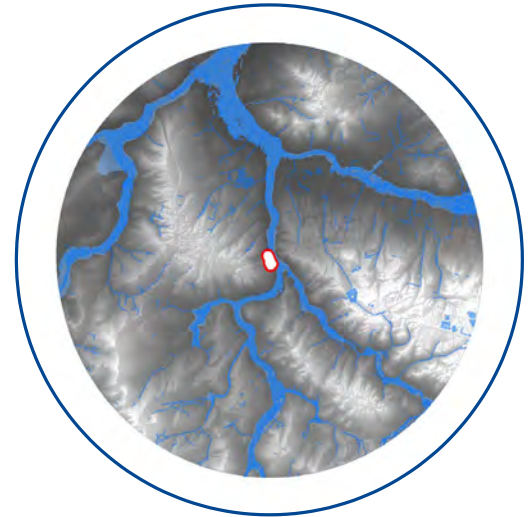
0.41 ha

Report Prepared for

ET Planning
200 Dukes Rise,
Crowthorne,
Berkshire,
RG45 6DS

Report Reference

75557.00.01R1



RISK – Very Low to Moderate

The Site is located within a fluvial Flood Zone 2 (medium probability) but benefits from the presence of flood defences. Taking into consideration the presence of defences, the risk of flooding from rivers and sea is classed as Low. The Site is at a Very Low risk of pluvial flooding and a Moderate risk of groundwater flooding.

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1. Executive summary



A review has been undertaken of national environmental data sets to assess the flood risk to the Site from all sources of flooding in accordance with the National Planning Policy Framework (NPPF) (2023) and National Planning Practice Guidance (NPPG) (Published in 2014 and updated in August 2022 and November 2023). A site-specific flood risk assessment, to assess the flood risk to and from the development Site, is provided within this concise interpretative report written by an experienced GeoSmart consultant. Baseline flood risk and residual risks that remain after the flood risk management and mitigation measures are implemented are summarised in the table below.

Site analysis

Source of Flood Risk	Baseline	After Mitigation
River (fluvial) flooding	Low to Very Low	Low to Very Low
Surface water (pluvial) flooding	Very Low	N/A
Groundwater flooding	Moderate to Low	Low to Negligible
Other flood risk factors present	No	N/A
Is any other further work recommended?	Yes	Yes (see below)

N/A = mitigation not required

Summary of existing and proposed development

The Site is currently used within a mixed use capacity as a dwelling and equestrian facilities including associated access, car parking and landscaping.

Development proposals comprise the demolition of the existing 6 buildings and the construction of a five-bedroom dwelling in the centre of the Site, with finished floor levels proposed at 51.20 mAOD, and garage in the north west with finished floor levels at 51.90 mAOD.

Summary of flood risks

The flood risks from all sources have been assessed as part of this report and are as follows:

- According to the Environment Agency's (EA) Flood Map for Planning Purposes, the Site is located within a fluvial Flood Zone 2 (Medium probability).
- The Site benefits from the presence of flood defences, 15 m away in fair condition, designed to provide a 1 in 5-year event standard of protection.
- The Site is located 22 m from a watercourse.
- According to the EA's Risk of Flooding from Rivers and Sea (RoFRS) map, which considers the type, condition and crest height of flood defences, the Site has a Low to Very Low risk of flooding from Rivers and the Sea.
- Modelled flood data obtained from the EA has been analysed in line with the most up to date guidance on climate change (EA, 2023), to confirm a maximum "design" flood level at the Site.

During a 1 in 100 year plus 14% climate change allowance event the Site would be unaffected by flooding. However, Flood Zone 2 is derived from a historic flood event, therefore mitigation to this event should be provided to eliminate the risk in the future.

Emergency evacuation routes are available to the west. In the event of a flood, safe refuge can be taken on the 1st floor levels and above.

- According to the EA's Risk of Flooding from Surface Water (pluvial) flood mapping, the Site has a Very Low risk of pluvial flooding.
- Groundwater Flood Risk screening data indicates there is a Moderate risk of groundwater flooding at the surface in the vicinity of the Site during a 1 in 100 year event.
- The risk of flooding from artificial (man-made) sources such as reservoirs, sewers and canals has been assessed:
 - The EA's Risk of Flooding from Reservoir map confirms the Site is not at risk of reservoir flooding.
 - Ordnance Survey (OS) data confirms there are no canals near to the Site.
 - A sewer flooding history search was undertaken with the utility provider and using the Strategic Flood Risk Assessment (Hart District Council, 2016). This confirms no recorded incidences of sewer flooding at or within the vicinity of the Site

The risk of flooding from artificial sources is considered to be Negligible.

In accordance with paragraphs 161, 168 and footnote 56 of the NPPF (2023), as the development proposals are comprised of the demolition of an existing building and construction of a similar building in its place within Flood Zone 2 it may be subject to the Sequential Test. Alternatively the location of the proposed development could be moved out of the Flood Zone to the west and still be within the proposed Site boundary.

Recommendations / Next steps

Recommendations for mitigation are provided below, based upon the proposed development and the flood risk identified at the Site.

- The Site is not identified as being at risk of fluvial flooding based on the JFLOW modelled data extent however, the Site has been affected in the past by the 1990 historic flood event.

Therefore, mitigation measures proposed are in-line with the EA's Standing Advice. It is recommended that the Finished Floor Levels (FFL) on the Site are 0.3 m (300 millimeters (mm)) above the general ground levels on Site.

- It is likely the flood mitigation measures recommended for fluvial risk will be sufficient to reduce the groundwater flood risk at the development. However specific groundwater measures that may also be considered for the Moderate risk identified include:
 - Waterproof tanking of the ground floor;
 - Interceptor drains;
 - Automatic sump and pump to extract flood water; and
 - Non-return flap valves on the proposed foul and surface water sewer lines.
- Occupants of the Site should be signed up to receive EA Flood Alerts and Flood Warnings.
- A Flood Warning and Evacuation Plan (FWEP) is recommended to ensure persons using the Site can evacuate safely on receipt of a Flood Warning.
- A Sustainable Drainage Strategy (SuDS) should be developed for the Site, for effective management of surface water runoff over the lifetime of the proposed development.

GeoSmart recommend the mitigation measures discussed within this report are considered as part of the proposed development where possible and evidence of this is provided to the Local Planning Authority as part of the planning application.

2. Introduction



Background and purpose

A site-specific flood risk assessment has been undertaken, to assess the flood risk to and from the development Site. This assessment has been undertaken by firstly compiling information concerning the Site and the surrounding area. The information gathered was then used to construct a 'conceptual site model', including an understanding of the appropriateness of the development as defined in the NPPF (2023) and the source(s) of any flood risk present, guided by the NPPG (Published in 2014 and updated in August 2022). Finally, a preliminary assessment of the steps that can be taken to manage any flood risk to the development was undertaken.

This report has been prepared with reference to the NPPF (2023) and NPPG (2022).

"The National Planning Policy Framework set out the Government's planning policies for England and how these are expected to be applied" (NPPF, 2023).

The NPPF (2023) and NPPG (2022) promote a sequential, risk based approach to the location of development. This also applies to locating a development within a Site which has a variable risk of flooding.

"This general approach is designed to ensure that areas at little or no risk of flooding from any source are developed in preference to areas at higher risk. The aim should be to keep development out of medium and high risk flood areas (Flood Zones 2 and 3) and other areas affected by other sources of flooding where possible" (NPPG, 2022).

The purpose of this report is to provide clear and pragmatic advice regarding the nature and potential significance of flood hazards which may be present at the Site.

Report scope

In accordance with the requirements set out within NPPG 2022 (Paragraph: 021 Reference ID: 7-021-20220825), a thorough review of a commercially available flood risk report and EA supplied data indicating potential sources of flood risk to the Site from rivers and coastal sources, surface run-off (pluvial), groundwater and reservoirs, including historical flood information and modelled flood extent. Appropriate measures are recommended to manage and mitigate the flood risk to the property.

Information obtained from the EA and a review of the Hart District Council Strategic Flood Risk Assessment (SFRA) are used to ascertain local flooding issues and, where appropriate, identify information to support a Sequential and/or Exception test required as part of the NPPF (2023).

The existing and future flood risks to and from the Site from all flood sources is assessed in line with current best practice using the best available data. The risk to the development has been assessed over its expected lifetime, including appropriate allowances for the impacts of climate change. Residual risks that remain after the flood risk management and mitigation

measures are implemented, are considered with an explanation of how these risks can be managed to keep the users of the development safe over its lifetime.

An indication of whether the Site will potentially increase flood risk elsewhere is provided, including where the proposed development increases the building footprint at the Site. A drainage strategy to control runoff can be commissioned separately if identified as a requirement within this report.

Report limitations

It is noted that the findings presented in this report are based on a desk study of information supplied by third parties. Whilst we assume that all information is representative of past and present conditions, we can offer no guarantee as to its validity and a proportionate programme of site investigations would be required to fully verify these findings.

The basemap used is the OS Street View 1:10,000 scale, however the Site boundary has been drawn using BlueSky aerial imagery to ensure the correct extent and proportion of the Site is analysed.

This report excludes consideration of potential hazards arising from any activities at the Site other than normal use and occupancy for the intended land uses. Hazards associated with any other activities have not been assessed and must be subject to a specific risk assessment by the parties responsible for those activities.

Datasets

The following table shows the sources of information that have been consulted as part of this report:

Table 1. Datasets consulted to obtain confirmation of sources of flooding and risk

Source of flooding	Datasets consulted				
	Commercial Flood Maps	Local Policy & Guidance Documents*	Environment Agency (Appendix B)	Utility provider (Appendix C)	OS Data
Historical	X	X	X		
River (fluvial) / Sea (tidal/coastal)	X	X	X		

Source of flooding	Datasets consulted				
	Commercial Flood Maps	Local Policy & Guidance Documents*	Environment Agency (Appendix B)	Utility provider (Appendix C)	OS Data
Surface water (pluvial)	X	X	X		
Groundwater	X	X			
Sewer		X		X	
Culvert/bridges		X			X
Reservoir		X	X		

*Local guidance and policy, referenced in Section 6, has been consulted to determine local flood conditions and requirements for flood mitigation measures.

3. Site analysis

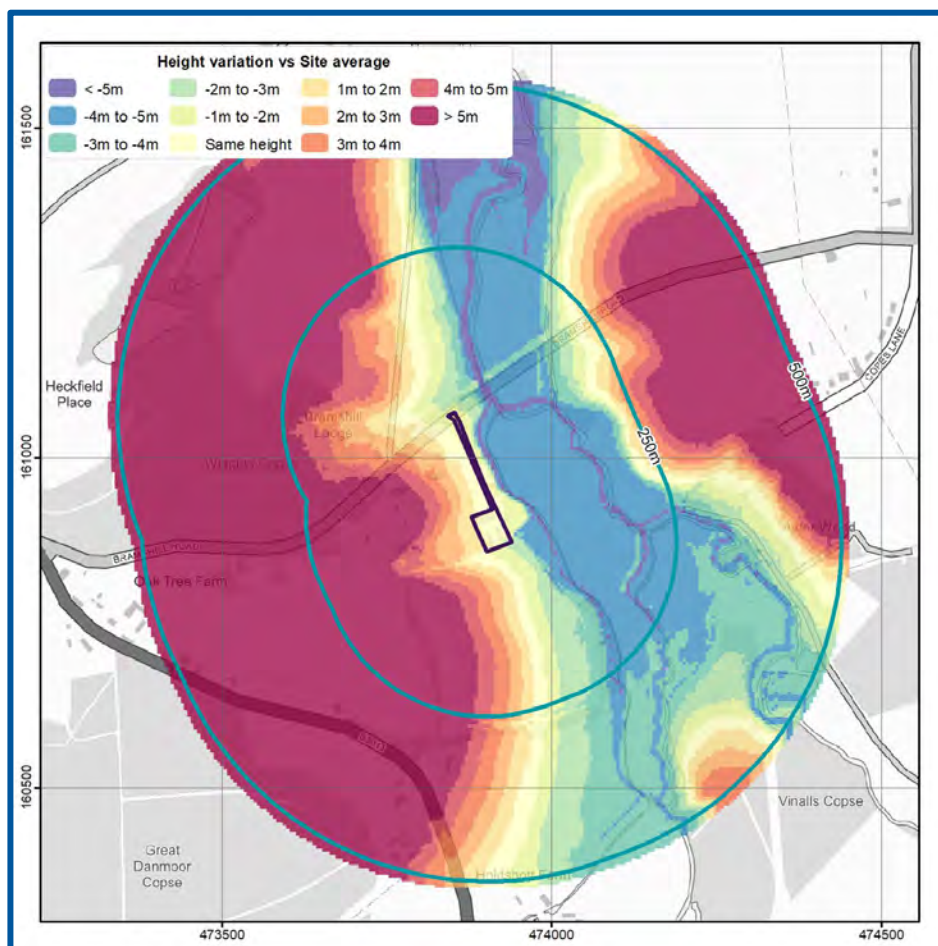


Site information

The Site is located in Bramshill Road, Heckfield, Hart, Hampshire, Southeast England, in a setting of agricultural land use at National Grid Reference SU 73897 60892. Site plans and drawings are provided in Appendix A.

According to OS data and topographic survey data, using a 500 m buffer around the Site, the general ground levels on the Site are between 49.76 and 52.64 mAOD with the Site falling gradually in an easterly direction. This is based on EA elevation data obtained for the Site to a 1 m resolution with a vertical accuracy of ± 0.15 m (Appendix C).

Figure 1. Site Location and Relative Elevations (GeoSmart, 2023).



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Development

The Site is currently used within a mixed use capacity as a dwelling and equestrian facilities including associated access, car parking and landscaping.

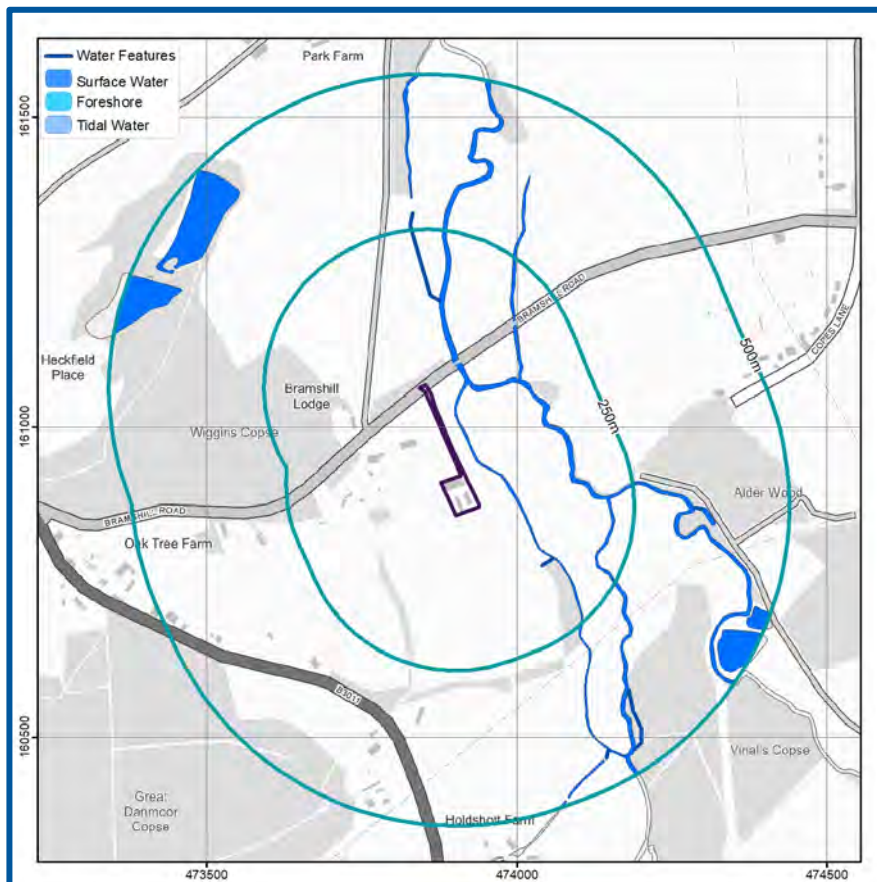
Development proposals comprise the demolition of the existing 6 buildings and the construction of a five-bedroom dwelling in the centre of the Site, with finished floor levels proposed at 51.20 mAOD, and garage in the north west with finished floor levels at 51.90 mAOD. Site plans are included within Appendix A.

The effect of the overall development will result in an increase in number of occupants and/or users of the building and will not result in the change of use, nature or times of occupation. According to Annex 3 of the NPPG (2022), the vulnerability classification of the existing development is Less Vulnerable and proposed development is More Vulnerable. The estimated lifespan of the development is 100 years.

Hydrological features

According to Ordnance Survey (OS) mapping included in the following figure, there are numerous surface water features within 500 m of the Site.

Figure 2. Surface water features (EA, 2023)



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The River Whitewater is approximately 22 m south at a lower elevation than the Site.

The River Hart and two unnamed water features are approximately 429 m southeast at a lower elevation than the Site.

A further two unnamed water features are approximately 464m northwest at a higher elevation than the Site.

Proximity to relevant infrastructure

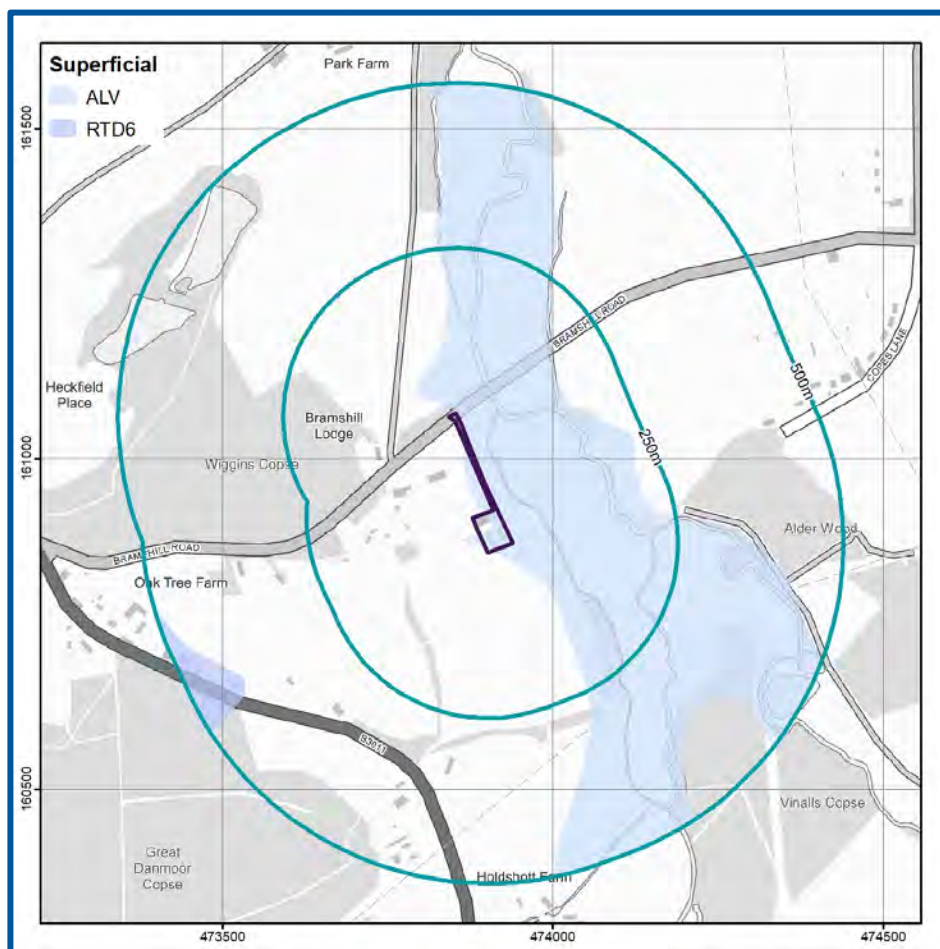
The nearest flood defences are located approximately 22 m east of the Site.

Bramshill Road Bridge is upstream of the Site approximately 67m to the east.

Hydrogeological features

British Geological Survey (BGS) mapping indicates the underlying superficial geology (Figure 3) of the majority of the site consists of Alluvium (ALV) (BGS, 2023) and is classified as a Secondary (A) Aquifer (EA, 2023).

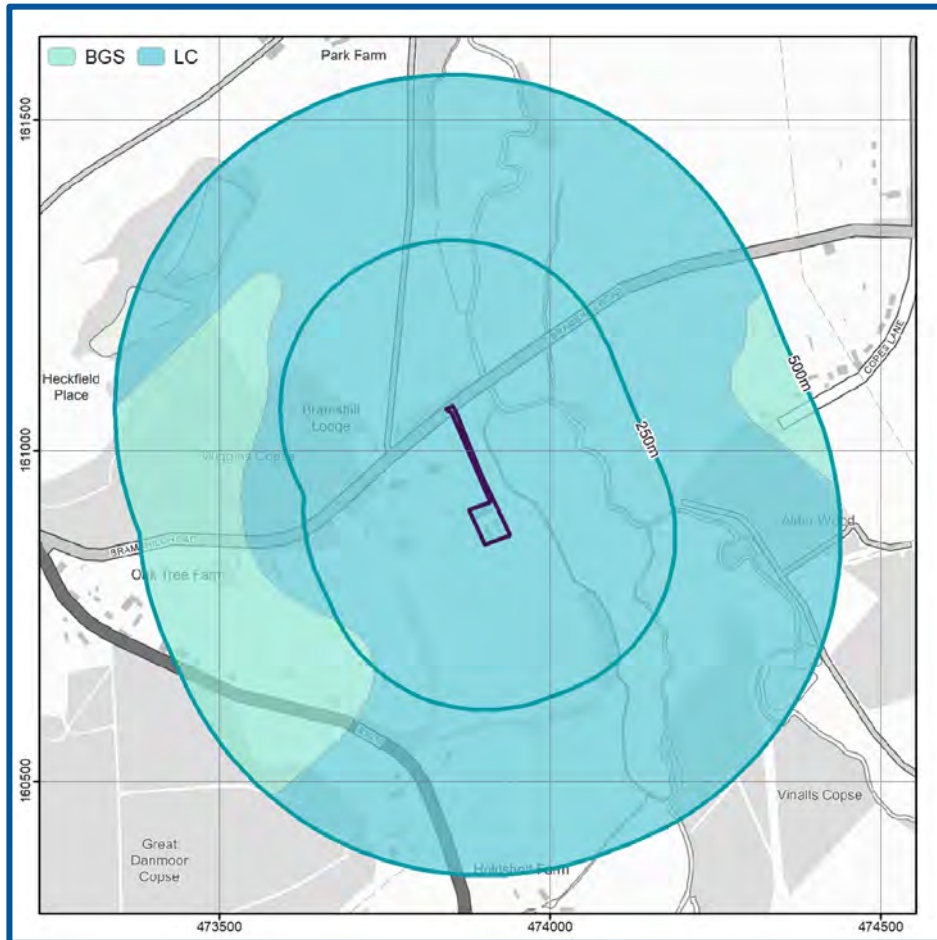
Figure 3. Superficial Geology (BGS, 2023)



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BGS mapping indicates the underlying bedrock geology (Figure 4) consists of the London Clay Formation (LC) (BGS, 2023) and is classified as Unproductive Strata (EA, 2023).

Figure 4. Bedrock Geology (BGS, 2023)



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The Site does not lie within a groundwater Source Protection Zone (SPZ) (EA, 2023).

A review of the BGS borehole database (BGS, 2023) indicates the nearest and most relevant borehole (ref: SU76SW13) is 190 m to the north west of the Site boundary at an elevation of 46.9 mAOD, and indicates 0.2 m thickness of top soil, underlain by alluvium to 2.1 m bgl (meters below ground level) which in turn is underlain by gravel to a depth of 3 m bgl, which in turn is underlain by clay to a depth of 3.5 m bgl where the borehole ends. Groundwater levels are recorded at 2.1 m bgl, subject to seasonal variations.

Groundwater levels may rise in the superficial aquifer in response to high river events subject to hydraulic continuity between the driving water level, the groundwater system and the Site.

Permeable material has been identified overlying low permeability material which could give rise to a shallow perched water table.

4. Flood risk to the development



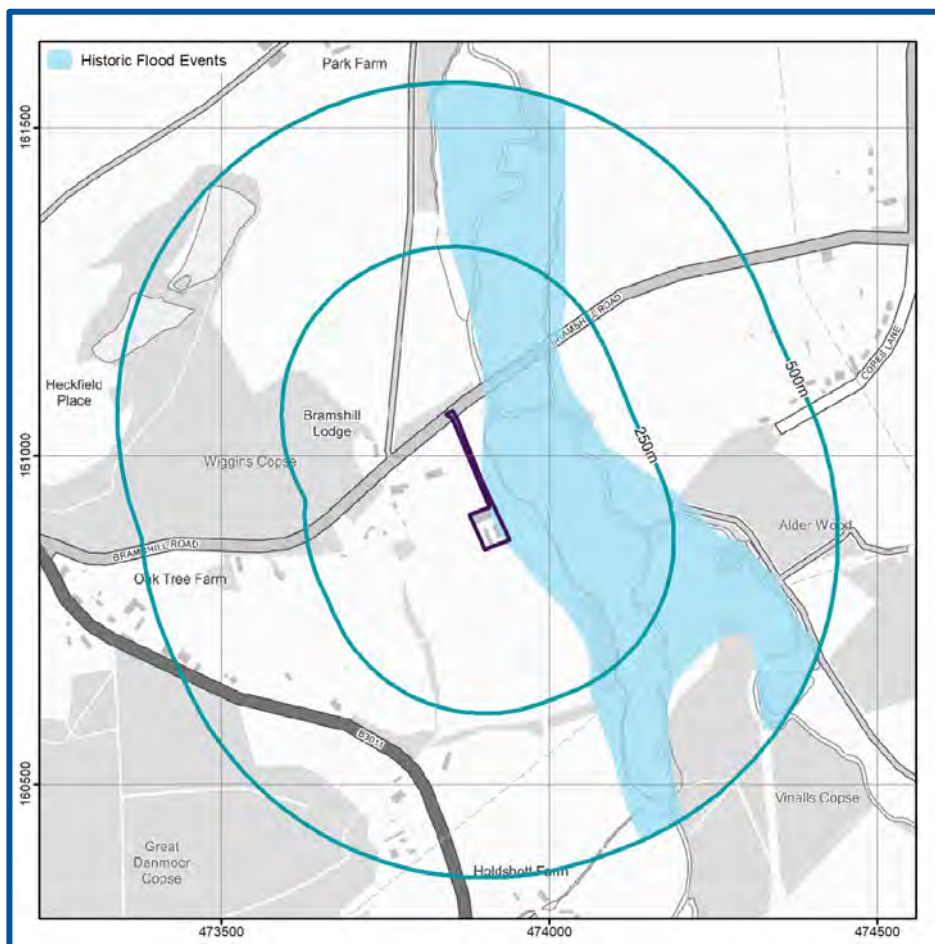
Historical flood events

According to the EA's historical flood map (Figure 5) indicates the eastern boundary of site has been affected historic flooding events (EA, 2023).

According to the SFRA, there have been no records of historic flooding at the Site.

The purpose of historical flood data is to provide information on where and why flooding may have occurred in the past. The absence of any recorded events does not mean flooding has never occurred on-Site or that flooding will never occur at the Site.

Figure 5. EA historic flood map



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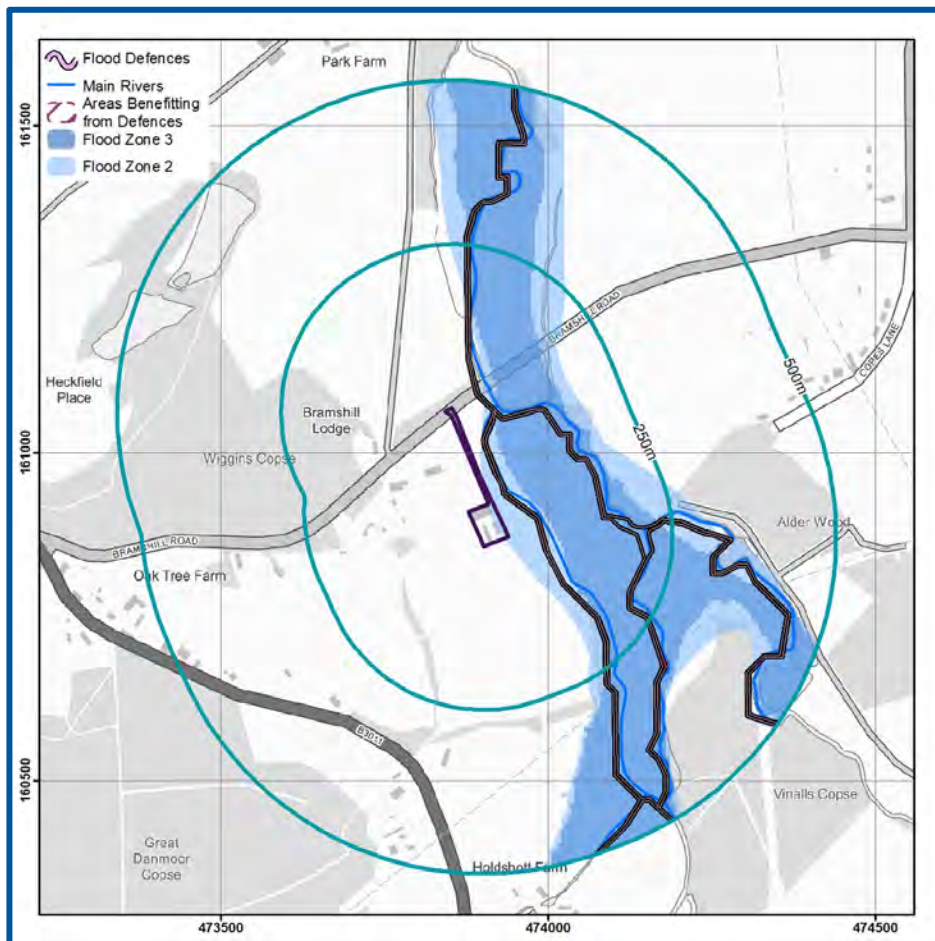
Rivers (fluvial) / Sea (coastal/tidal) flooding

The predominant risk at the Site is from flooding from rivers, termed as fluvial flooding. The Site is located in an inland location and the risk of flooding from coastal and tidal processes are therefore considered to be Negligible.

River (fluvial) flooding occurs during times of heavy rainfall or snow melt when watercourses' capacity can be exceeded, over topping the banks and flood defences.

According to the EA's Flood Map for Planning Purposes (Figure 6), the eastern boundary of Site is located within fluvial Flood Zone 2 and is therefore classified as having a Medium probability of fluvial flooding from the River Whitewater/Hart. As the eastern boundary is affected this may affect the access to Site if inundated. The south and west of Site is within Flood Zone 1 and is therefore classified as having a Low probability of fluvial flooding.

Figure 6. EA Flood Map for Planning Purposes (EA, 2023)



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As defined in the NPPF (2023):

Ignoring the presence of any defences, land located in a Flood Zone 2 is considered to have a Medium probability of flooding, with between a 1 in 100 and 1 in 1000 annual probability of fluvial flooding or between a 1 in 200 and 1 in 1000 annual probability of coastal flooding in any one year.

Development of all uses of land is appropriate in this zone (see glossary for terminology).

Flood defences

Sites that are located close to flood defences are likely to be zones where rapid inundation will occur in the event of the flood defences being overtopped or breached. A Site located close to flood defences (within 250 m) may require a more detailed FRA subject to local topography.

- The Site is in an area which benefits from flood defences.¹

Information from the EA relating to the flood defences is outlined below.

- According to the EA (2023) the flood defences in place for this area are designed to defend up to a 1 in 5 year flood event.
- The nearest and most applicable formal flood defences are raised and maintained by the EA.
- The EA inspects the defences twice a year and classifies their current condition as “Good (Condition Grade: 2)”.

Model data

The EA's product 4 data was requested on the 1st October 2021. The EA responded on 16th November 2021 but stated the following:

“Thank you for your email requesting Product 4 data.

¹ The EA maps Areas which Benefit from the presence of Defences (ABD) in a 1 in 100 (1%) chance of flooding each year from rivers; or 1 in 200 (0.5 %) chance of flooding each year from the sea. If the defences were not there, these areas would flood in a 1 in 100 (1%)/ 1 in 200 (0.5 %) or larger flooding incident. The EA do not show all areas that benefit from all flood defences, some defences are designed to protect against a smaller flood with a higher chance of occurring in any year, for example a flood defence which protects against a 1 in 30 chance of flooding in any year. Such a defence may be overtopped in a flood with a 1 in 100 (1%)/ 1 in 200 (0.5%) chance of occurring in any year, but the defence may still reduce the affected area or delay (rather than prevent) a flood, giving people more time to act and therefore reduce the consequences of flooding.

I'm really sorry for the delay in sending a response to you, we are dealing with a high volume of enquiries.

Unfortunately, we do not have any detailed flood risk modelling in this location. Therefore, we are unable to provide modelled flood levels and extents for your site".

The extent of Flood Zone 2 has been derived from JFLOW 1 in 1000 modelled event and the 1990 historic flood event outline.

JFLOW modelling

The modelled fluvial flood depth data was created for the 1% and 0.1% annual chance of flooding situations and was produced as a by-product from the 2004 generalised modelling project in 2004, using JFLOW modelling. The purpose of the generalised modelling project was to fill the gaps where there was no detailed local modelled data in 2004, in order to define the extents of Flood Zones for spatial planning. A two-dimensional hydrodynamic model called JFLOW was used to produce this modelled fluvial flood depth data on a 5x5m grid.

Since 2004, local detailed modelling has been used to replace this generalised modelling in many areas to define the extents of Flood Zones. However, the JFLOW dataset in this location has not been updated.

JFLOW was used to produce flood maps for the whole of England and Wales for all catchments greater than 3 sq km in a consistent manner. The method is therefore very generalised and therefore cannot take account of information that may be very significant locally. This might include:

1. Effects of bridges and other structures including flood defences are not taken into account.
2. Errors in the DTM, caused by trees and buildings for example.
3. The effect of reservoirs and urban drainage and other man made influences on the flow regime can only be taken into account in a very general sense in JFLOW.
4. The channel is assumed to be able to take the 2 year flow. This may not be true especially in those modified by man.
5. Hydraulic roughness is assumed to be the same everywhere in JFLOW, but of course it is not.

In light of this and as there is no detailed modelling included within the SFRA, to estimate flood levels at the Site, the EA's 1m LiDAR data has been compared with the EA's flood zones.

The 1m LiDAR data has been classified and the highest elevation on the extent of the Flood Zone 3 and 2 has been used to form the basis for the 1 in 100 year and 1 in 1000-year flood events respectively (Figure 7)².

Using the method described above, the following flood levels have been estimated for the Site:

² As the calculated flood elevation is based on LiDAR the accuracy of the calculated level is +/- 0.15m.

Table 2. Estimated flood levels using 1m LiDAR data

Ground levels within the proposed development area at the Site (mAOD)	Modelled Flood Levels (mAOD)		Historic Flood Outline Level (mAOD)
	1 in 100 year	1 in 1000 year	
50.98 and 52.61	47.14	47.24	51.1
Flood depths	No flooding	No flooding	Up to 0.12

It should be noted that the 1990 historic flood event outline has not been checked as part of this report and it may not be entirely accurate as it is likely this will have been digitised from an aerial photograph.

Climate change factors

The EA's *Flood risk assessments: climate change allowances* guidance (Published 19 February 2016 and updated 22 July 2020) has been used to inform a suitable increase in peak river flows for the proposed development.

The updated guidance confirms 'More Vulnerable' developments are required to undertake a Basic assessment approach.

As the Site is located within the Loddon and tributaries Management Catchment and the proposed development is classed as More Vulnerable, where the proposed lifespan is approximately 100 years, the Central (14%) allowance has been used to determine a suitable climate change factor to apply to river data.

A stage graph has been produced (Appendix B) using the EA's modelled flood level data. The climate change allowances have been derived as a proportion of the 100-year peak flow to the 1 in 100- year event, using the Flood Studies Report (1975) growth curves, therefore the following flood levels apply, but these would not affect the areas proposed for development.

Table 3. Flood levels plus climate change allowances

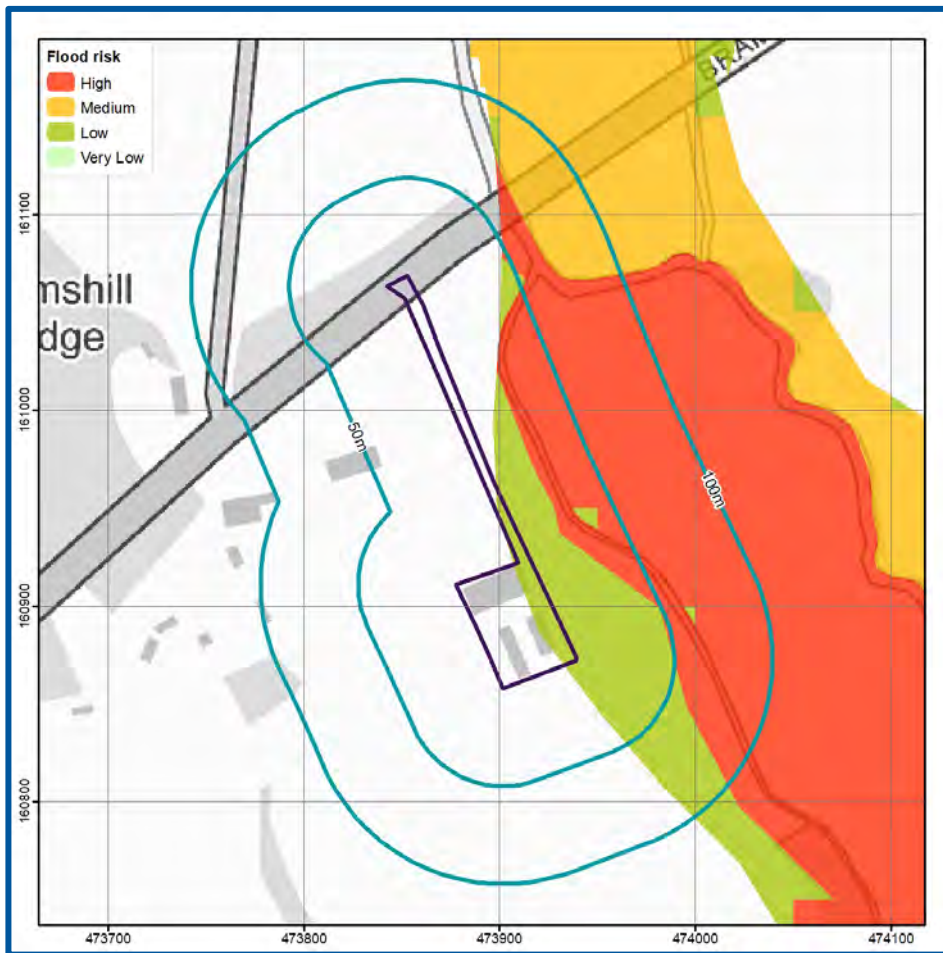
Ground levels within the proposed development area at the Site (mAOD)	1 in 100 year plus 14% allowance for climate change flood level (mAOD)
50.98 and 52.61	48.10

Flood risk including the benefit of defences

The type and condition of existing flood defences influence the 'actual' risk of fluvial flooding to the Site, albeit the long-term residual risk of flooding (ignoring the defences) should be considered when proposing new development.

According to the EA's Risk of Flooding from Rivers and the Sea (RoFRS) mapping (Figure 7), which considers the crest height, standard of protection and condition of defences, the flood risk from Rivers and the Sea is Low. It is important to note this risk only applies to the East of the site. The north, south and west risk from Rivers and Sea is Very Low.

Figure 7. Risk of Flooding from Rivers and Sea map (EA, 2023)



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Surface water (pluvial) flooding

Surface water flooding occurs when intense rainfall exceeds the infiltration capacity of the ground and overwhelms the drainage systems. It can occur in most locations even at higher elevations and at significant distances from river and coastal floodplains.

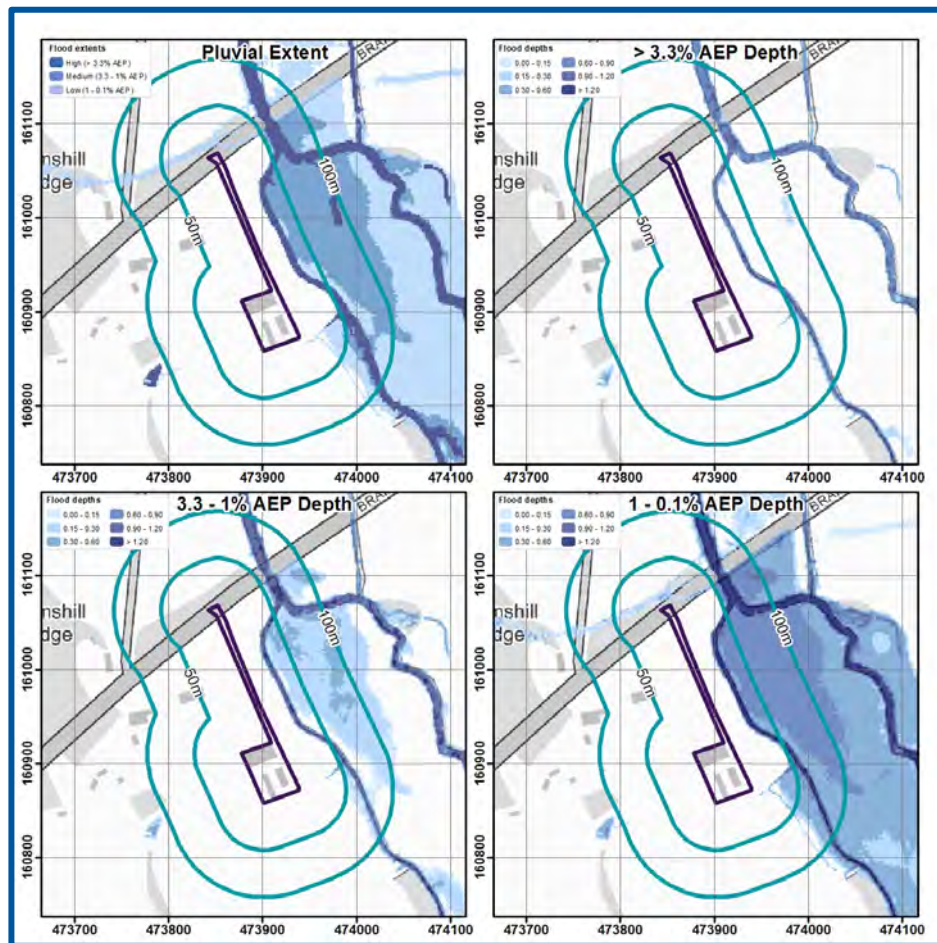
- According to the EA's Risk of Flooding from Surface Water (pluvial) flood mapping, the Site has a Very Low risk of pluvial flooding.

According to EA's surface water flood risk map the Site is at:

- Very Low risk - chance of flooding of less than 1 in 1000 (0.1%).

Figure 8 confirms the extent and depth of flooding during a 3.3% AEP (1 in 30 year – High risk) event, a 1% AEP (1 in 100 year - medium risk) event and a 0.1% AEP (1 in 1000 year – Low risk) event. This confirms the site is not at risk of pluvial flooding.

Figure 8. EA surface water flood extent and depth map (EA, 2023)



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According to EA's surface water flood risk map the following advisory guidance applies to the Site:

Flood Depth

- Less than 0.3 m - site is unlikely to be affected

Analysis of OS mapping, ground elevation data and the EA's pluvial flow route mapping in the 1 in 100 year event confirms the Site is not located on a potential overland flow route during a Medium risk scenario.

The SFRA does not indicate reported incidents of historical surface water flooding within 100 m of the Site and confirms the Site is not located within a Critical Drainage Area (CDA)³ (Hart District Council, 2016).

Climate change may lead to an increase in rainfall intensity which affects river levels, land and urban drainage systems. Rainfall intensity for small and urban catchments may increase from 5 to 20% (central estimate) or 10% to 40% (Upper estimate) over the period to 2115 (EA, 2021). The increase in surface water flood risk is best represented by the 1 in 1000 year pluvial flood extent but according to the mapping this is unlikely to impact the Site.

On-Site surface water drainage systems should be designed appropriately to manage the run-off.

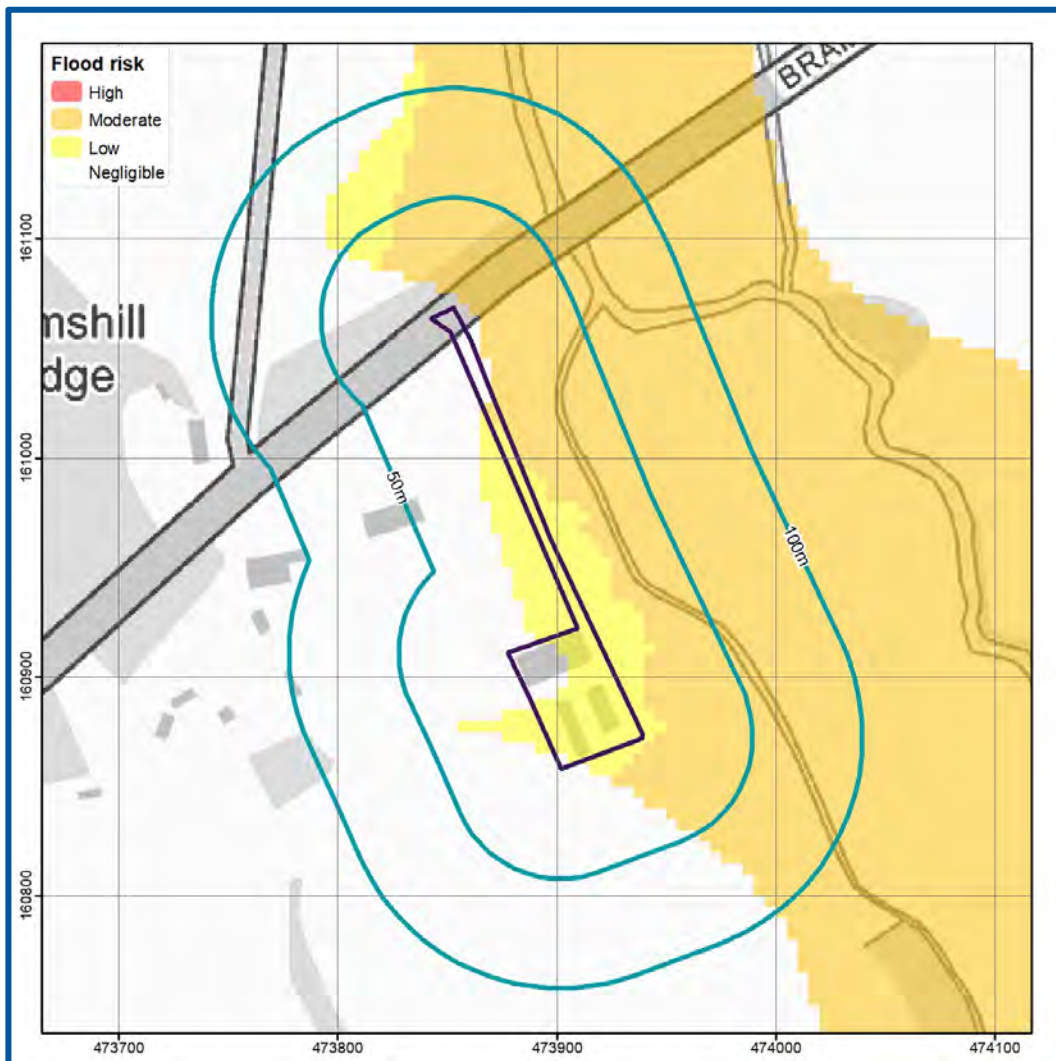
³ A Critical Drainage Area (CDA) is an area that has critical drainage problems and which has been notified to the local planning authority as such by the Environment Agency in line with the National Planning Policy Framework (NPPF, 2023). CDA's are specific to Flood Zone 1, defined as areas where runoff can and may have historically contributed to flooding downstream, although they are not necessarily areas where flooding problems may occur. Where a Site is located in Flood Zone 1 and within a CDA, a Flood Risk Assessment (FRA) is required and the Council may also request Sustainable Drainage Scheme (SuDS) features to be included within the proposed development.

Groundwater flooding

Groundwater flooding occurs when sub-surface water emerges from the ground at the surface or into Made Ground and structures. This may be as a result of persistent rainfall that recharges aquifers until they are full; or may be as a result of high river levels, or tides, driving water through near-surface deposits. Flooding may last a long time compared to surface water flooding, from weeks to months. Hence the amount of damage that is caused to property may be substantially higher.

Groundwater Flood Risk screening data (Figure 9) indicates there is a Moderate to Low risk of groundwater flooding at surface in the vicinity from permeable superficial during a 1 in 100 year event. This event is likely to affect the majority of the site. However, the site's west boundary poses a negligible risk.

Figure 9. GeoSmart GW5 Groundwater Flood Risk Map (GeoSmart, 2023)



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Mapped classes combine likelihood, possible severity and the uncertainty associated with predicting the subsurface system. The map is a national scale screening tool to prompt site-

specific assessment where the impact of groundwater flooding would have significant adverse consequences. Mapping limitations and a number of local factors may reduce groundwater flood risk to land and property even where it lies within mapped groundwater flood risk zones, which do not mean that groundwater floods will occur across the whole of the risk area.

The SFRA does not indicate reported incidents of historical ground water flooding within 20 m of the Site (Hart District Council, 2016).

A site-specific assessment has been undertaken to refine the groundwater risk screening information on the basis of site-specific datasets (see Section 3) including BGS borehole data and the EA's fluvial and tidal floodplain data (where available) to develop a conceptual groundwater model. The risk rating is refined further using the vulnerability of receptors including occupants and the existing and proposed Site layout, including the presence of basements and buried infrastructure. The presence of any nearby or on-Site surface water features such as drainage ditches, which could intercept groundwater have also been considered.

Based on a review of (limited) site specific data groundwater levels may rise in the superficial aquifer in response to high river events.

It is noted that groundwater flooding may occur in response to prolonged high river levels even if overtopping of flood defences does not occur.

A shallow water table has been identified potentially within 5 m of the ground surface.

On the basis of the site-specific assessment the groundwater flood risk is considered to be Moderate to Low.

Guidance

Moderate Risk - There will be a significant possibility that incidence of groundwater flooding could lead to damage to property or harm to other sensitive receptors at, or near, this location.

Climate change predictions suggest an increase in the frequency and intensity of extremes in groundwater levels. Rainfall recharge patterns will vary regionally resulting in changes to average groundwater levels. A rise in peak river levels will lead to a response of increased groundwater levels in adjacent aquifers subject to the predicted climate change increases in peak river level for the local catchment.

The impact of climate change on groundwater levels beneath the Site is linked to the predicted rise in peak river levels.

Based on the available evidence the resulting increase to groundwater flood risk will be mitigated by the proposed measures.

Flooding from artificial sources

Artificial sources of flood risk include waterbodies or watercourses that have been amended by means of human intervention rather than natural processes. Examples include reservoirs (and associated water supply infrastructure), docks, sewers and canals. The flooding mechanism associated with flood risk from artificial sources is primarily related to breach or failure of structures (reservoir, lake, sewer, canal, flood storage areas, etc.)

Sewer flooding

Records held by Thames Water indicate that there have been no incidences of flooding related to the surcharging of public sewers at the Site (Thames Water, 2021; Appendix C).

Guidance

Properties classified as “at risk” are those that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system either once or twice in the ten year reference period. Records held by the sewage utility company provide information relating to reported incidents, the absence of any records does not mean that the Site is not at risk of flooding.

Canal failure

According to Ordnance Survey (OS) mapping, there are no canals within 500 m of the Site.

Water supply infrastructure

Water supply infrastructure is comprised of a piped network to distribute water to private houses or industrial, commercial or institution establishments and other usage points. In urban areas, this represents a particular risk of flooding due to the large amount of water supply infrastructure, its condition and the density of buildings. The risks of flooding to properties from burst water mains cannot be readily assessed.

If more information regarding the condition and history of the water supply infrastructure within the vicinity of the Site is required, then it is advisable to contact the local water supplier South East Water.

Culverts and bridges

The blockage of watercourses or structures by debris (that is, any material moved by a flowing stream including vegetation, sediment and man-made materials or refuse) reduces flow capacity and raises water levels, potentially increasing the risk of flooding. High water levels can cause saturation, seepage and percolation leading to failure of earth embankments or other structures. Debris accumulations can change flow patterns, leading to scour, sedimentation or structural failure.

Culverts and bridges have been identified within 500 m of the Site.

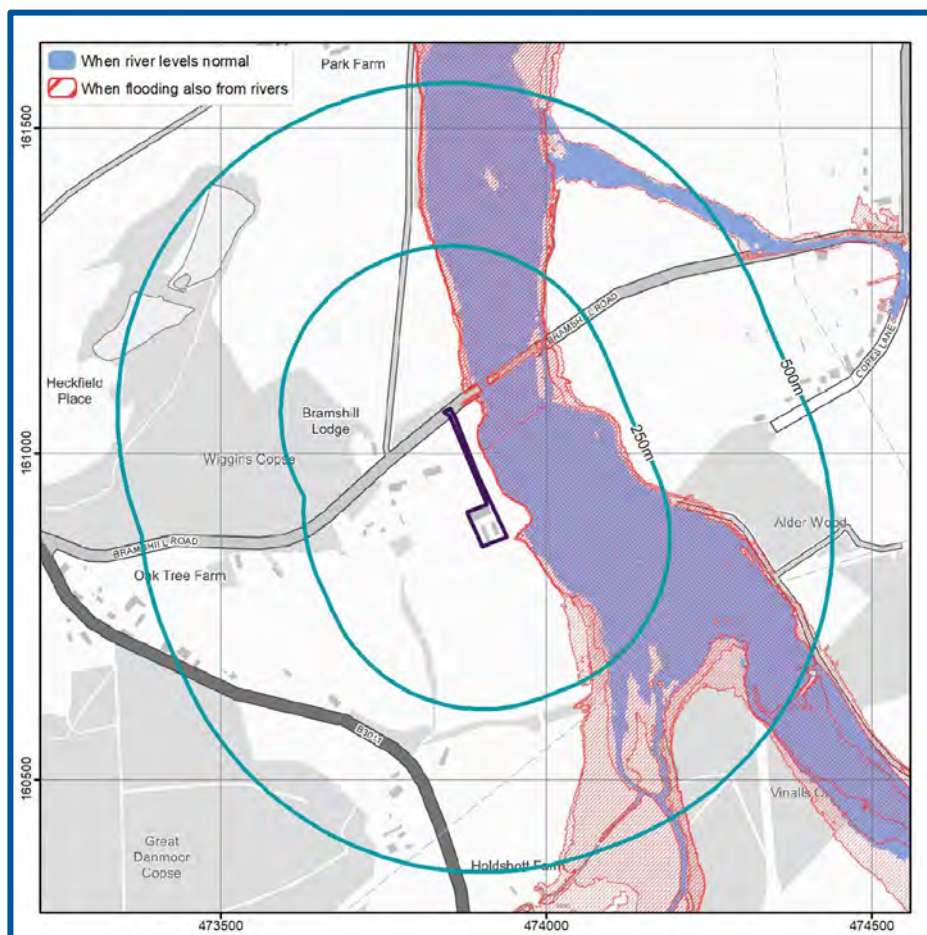
The Site lies immediately adjacent of the infrastructure and could potentially be affected by flooding as a result of blockage. Further assessment of local elevation data indicates the Site lies above adjacent land and is therefore unlikely to be at risk. An additional assessment is therefore not required.

The SFRA has not identified any historic drainage issues within the Site area (Hart District Council, 2016).

Reservoir flooding

According to the EA's Risk of Flooding from Reservoir mapping the Site is not at risk of flooding from reservoirs (Figure 10) (EA, 2023).

Figure 10. EA Risk of Reservoir Flooding (EA, 2023)



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Guidance

The risk of reservoir flooding is related to the failure of a large reservoir (holding over 25,000 m³ of water) and is based on the worst-case scenario. Reservoir flooding is extremely unlikely to occur (EA, 2023).

5. Flood risk from the development



Floodplain storage

The development is located within a fluvial Flood Zone and involves an increase in building footprint but would not be impacted by the 1 in 100 years plus 14% climate change event. Therefore, compensatory flood storage is not required for any losses in flood plain storage as the proposed development would not displace flooding during the 1 in 100 years plus 14% climate change event.

Drainage and run-off

The proposed development involves an increase of impermeable surfaces at the Site. An estimation of run-off is therefore required to permit effective Site water management and prevent any increase in flood risk to off-Site receptors from the Site.

The potential surface water run-off generated from the Site during a 1 in 100 year return period should be calculated, using FEH 2013 rainfall data from the online Flood Estimation Handbook (FEH), developed by NERC (2009) and CEH (2016).

The NPPF (2023) recommends the effects of climate change are incorporated into FRA's and the recently updated climate change guidance (published in 2016 and updated in 2021) confirms the requirements for inclusion within FRA's.

As the proposed development is being changed to residential, the lifespan of the development and requirements for climate change should allow up to the 2115 scenario.

Table 4. Climate change rainfall allowances

Applies across all of England	Total potential change anticipated for 2010 to 2039	Total potential change anticipated for 2040 to 2059	Total potential change anticipated for 2060 to 2115
Upper end	10%	20%	40%
Central	5%	10%	20%

Sustainable Drainage System (SuDS)

It is recommended that attenuation of run-off is undertaken on-Site to compensate for proposed increases in impermeable surface areas. Attenuation may comprise the provision of storage within a Sustainable Drainage System (SuDS). SuDS can deliver benefits from improving the management of water quantity, water quality, biodiversity and amenity. Potential SuDS options are presented in the table below, subject to further investigation:

Table 5. SuDS features which may be feasible for the Site

Option	Description
Rainwater harvesting	Rainwater harvesting can collect run-off from the roofs for use in non-potable situations, using water butts for example.
Permeable paving	Permeable pavements can be used for driveways, footpaths and parking areas to increase the amount of permeable land cover. Suitable aggregate materials (angular gravels with suitable grading as per CIRIA, 2007) will improve water quality due to their filtration capacity. Plastic geocellular systems beneath these surfaces can increase the void space and therefore storage but do not allow filtration unless they are combined with aggregate material and/or permeable geotextiles.
Soakaways	An excavation filled with gravel within the Site. Surface water run-off is piped to the soakaway.

It is assumed that any changes to the existing drainage system will be undertaken in accordance with best practice and that care will be taken to ensure the new development does not overload/block any existing drainage or flow pathways to/from the Site. Based on the topography and Low surface water flood risk in the vicinity interference with overland flow paths is considered unlikely.

6. Suitability of the proposed development



The information below outlines the suitability of proposed development in relation to national and local planning policy.

National policy and guidance

The aims of the national planning policies are achieved through application of the Sequential Test and in some cases the Exception Test.

Guidance

Sequential test: The aim of this test is to steer new development towards areas with the lowest risk of flooding (NPPF, 2023). Reasonably available sites located in Flood Zone 1 should be considered before those in Flood Zone 2 and only when there are no reasonably available sites in Flood Zones 1 and 2 should development in Flood Zone 3 be considered.

Exception test: In some cases, this may need to be applied once the Sequential Test has been considered. For the exception test to be passed it must be demonstrated that the development would provide wider sustainability benefits to the community that outweigh flood risk and a site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

Suitability of the proposed development, and whether the Sequential and Exception Tests are required, is based on the Flood Zone the Site is located within and the flood risk vulnerability classification of the existing and proposed development. Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

This report has been produced to assess all development types, prior to any development. The vulnerability classification and Flood Zones are compared within Table 6 overleaf (Table 2 of the NPPG (2022)).

As the Site is located within Flood Zone 2 and the proposed development is defined as More Vulnerable; the proposals would be acceptable, but may be subject to the Sequential Test.

Where the Sequential Test is required it must be demonstrated that there are no alternative reasonably available Sites at lower risk of flooding. For a site to be considered to be reasonably available it must be 'deliverable' and 'developable' as defined by the NPPF (2023).

Table 6. Flood risk vulnerability and flood zone 'compatibility (taken from NPPG, 2022)

Flood risk vulnerability classification		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood Zone	Zone 1 – low probability	✓	✓	✓	✓	✓
	Zone 2 – medium probability	✓	✓	Exception test required	✓	✓
	Zone 3a – high probability	Exception test required	✓	X	Exception test required	✓
	Zone 3b – functional flood plain	Exception test required	✓	X	X	X

EA Flood Risk Standing Advice for vulnerable developments located in Flood Zones 2 or 3

For all relevant vulnerable developments (i.e. more vulnerable, less vulnerable and water compatible), advice on the points should be followed:

- Surface water management;
- Access and evacuation; and
- Floor levels.

Surface water management

Plans for the management of surface water need to meet the requirements set out in either the local authority's:

- Surface water management plan where available; OR
- Strategic flood risk assessment.

They also need to meet the requirements of the approved building regulations Part H: drainage and water disposal. Read section H3 rainwater drainage.

Planning permission is required to use a material that can't absorb water (e.g., impermeable concrete) in a front garden larger than 5m².

Access and evacuation

Details of emergency escape plans should be provided for any parts of a building that are below the estimated flood level:

Plans should show:

- Single storey buildings or ground floors that don't have access to higher floors can access a space above the estimated flood level, e.g. higher ground nearby;
- Basement rooms have clear internal access to an upper level, e.g. a staircase;
- Occupants can leave the building if there's a flood and there's enough time for them to leave after flood warnings.

Floor levels

The following should be provided:

- Average ground level of the building; and
- Finished floor level of the lowest habitable room in the building.

Ground floor levels should be a minimum of whichever is higher of:

- 0.3 m above the general ground level of the Site; OR
- At least 0.6 m above the estimated river or sea flood level⁴.

If you cannot raise floor levels above the estimated flood level, you need to consider extra flood resistance and resilience measures.

Extra flood resistance and resilience measures

Follow the extra flood resistance and resilience requirements for developments in flood risk areas where ground floor levels are lower than the estimated flood level for the Site.

Water depth up to 0.3 m

The design of the building or development should keep water out as much as possible. You should use materials that have low permeability (materials that water cannot pass through, for example, impermeable concrete).

⁴ This is 0.6 m above the 1 in 100 year fluvial or 1 in 200 year tidal flood events. The 0.6 m is split into a 0.3 m freeboard allowance for climate change and 0.3 m allowance for the inaccuracies in the EA's flood modelling. Where the climate change flood level is known, a 0.3 m allowance should be added to the climate change flood level to allow for the inaccuracies in the EA's flood modelling.

Water depth from 0.3 m to 0.6 m

The design of the building or development should keep water out (unless there are structural concerns) by:

- using materials with low permeability to at least 0.3 m
- using flood resilient materials (for example lime plaster) and design (for example raised electrical sockets)
- making sure there's access to all spaces to enable drying and cleaning

Water depth above 0.6 m

The design of the building or development should allow water to pass through the property to avoid structural damage by:

- using materials with low permeability to at least 0.3 m
- making it easy for water to drain away after flooding
- making sure there's access to all spaces to enable drying and cleaning

Local policy and guidance

For this report, several documents have been consulted for local policy and guidance and relevant information is outlined below:

Hart Local Plan 2032 (April, 2020):

- 266. New developments should not increase the risk of flooding elsewhere and should be safe from flooding themselves. Inappropriate development in areas at risk of flooding from any source should be avoided by directing development away from areas at highest risk. We must also take into account the likely impacts of climate change in considering flood risk issues.
- 269. Sustainable Drainage Systems (SuDS) that mimic natural systems are required where feasible on all major developments and are encouraged on minor developments (also see following paragraph regarding Causal Areas). SuDs should seek to enhance water quality, amenity and biodiversity and arrangements should be put in place for their whole life management and maintenance. Where SuDs cannot be implemented a justification must be provided along with proposed alternative sustainable approaches to surface water management. Drainage designs will be expected to comply with current best practice guidance.
- 271. Measures such as natural flood risk management measures; de-culverting of water courses, use of water butts or rainwater harvesting and removing surface water flows from the foul sewer will also be encouraged. The particular measures used to reduce flood risk off-site will depend on site specific circumstances and be proportionate to the scale of development.

Hart District Council Strategic Flood Risk Assessment (2016):

- 14.2 Managing surface water runoff from new developments. To manage surface water runoff from the Site the following measures should be considered:
 - a. No increased in surface water runoff rates and discharge volumes for all storm events up to the 1 in 100 plus climate change storm events.
 - b. No flooding from the surface water drainage system pipe network up to the 1 in 30 storm event. Any flooding between the 1 in 30 and 1 in 100 plus climate change storm event must be safely contained on Site.
 - c. Sites should use a wide range of Sustainable Drainage Systems (SuDS) preferably in the form of a SuDS Treatment Train. SuDS devices are designed to mimic natural drainage process. They can be used to control water quality, quantity and provide amenity and biodiversity benefits. SuDS can be adapted to almost all situations we would expect all development to try an include SuDS. Ideally larger development should be linking together SuDS to form a treatment trains to maximum the removal of pollutants. Further details are given in the section on SuDS below.

Guidance

Strategic Flood Risk Assessments are carried out by local authorities, in consultation with the Environment Agency, to assess the flood risk to the area from all sources both now and in the future due to climate change. They are used to inform planning decisions to ensure inappropriate development is avoided (NPPF, 2023).

Environment Agency pre-application response:

The EA (2023) was contacted as part of this FloodSmart report in order to obtain site-specific feedback on the proposed development.

However, a response was not received within the timeframe of this report.

7. Resilience and mitigation



Based on the flood risk identified at the Site, the national and local policies and guidance and proposed development, the mitigation measures outlined within this section of the report are likely to help protect the development from flooding.

Sea (coastal/tidal) flood mitigation measures

As the Site is not identified as being at risk of flooding from the sea, mitigation measures are not required.

Rivers (fluvial) flood mitigation measures

The Site is not identified as being at risk of fluvial flooding based on the JFLOW modelled data extent however, the Site has been affected in the past by the 1990 historic flood event.

Therefore, mitigation measures proposed are in-line with the EA's Standing Advice. We recommend that the Finished Floor Levels (FFL) on the Site are 0.3 m (300 millimeters (mm)) above the general ground levels on Site.

If finished floor levels are able to be raised this could reduce the flood risk to the development from Low to Very Low.

Surface water (pluvial) flood mitigation measures

As the Site is not identified as being at risk of pluvial flooding, mitigation measures are not required.

Groundwater flood mitigation measures

It is likely the flood mitigation measures recommended for fluvial risk will be sufficient to reduce the groundwater flood risk at the development. However specific groundwater measures that may also be considered for the Moderate risk identified include:

- Waterproof tanking of the ground floor;
- Interceptor drains;
- Automatic sump and pump to extract flood water; and
- Non-return flap valves on the proposed foul and surface water sewer lines.

If these mitigation measures are implemented this could reduce the flood risk to the development from Moderate to Low to Low to Negligible.

Reservoir flood mitigation measures

The Site is not a risk of flooding from reservoirs; therefore, mitigation measures are not required.

Other flood risk mitigation measures

As the Site is not identified as at risk from other sources, mitigation measures are not required.

Residual flood risk mitigation measures

The risk to the Site has been assessed from all sources of flooding and appropriate mitigation and management measures proposed to keep the users of the development safe over its lifetime. There is however a residual risk of flooding associated with the potential for failure of mitigation measures if regular maintenance and upkeep isn't undertaken. If mitigation measures are not implemented or maintained, the risk to the development will remain as the baseline risk.

Further flood mitigation information

More information on flood resistance, resilience and water entry can be found here: [3](http://www.knowyourfloodrisk.co.uk)
www.knowyourfloodrisk.co.uk

Emergency evacuation - safe access / egress and safe refuge

Emergency evacuation to land outside of the floodplain should be provided if feasible. Where this is not possible, 'more vulnerable' developments and, where possible, development in general (including basements), should have internal stair access to an area of safe refuge within the building to a level higher than the maximum likely water level. An area of safe refuge should be sufficient in size for all potential users and be reasonably accessible to the emergency services.

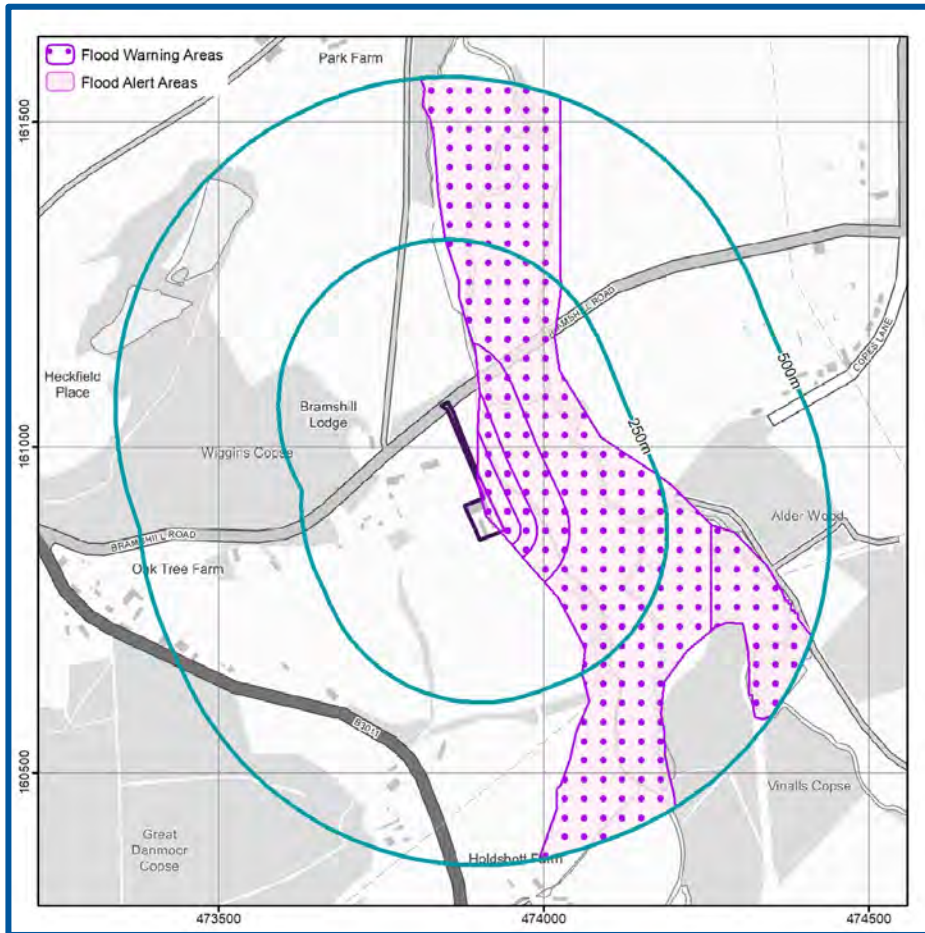
Emergency evacuation from the development and the Site should only be undertaken in strict accordance with any evacuation plans produced for the Site, with an understanding of the flood risks at the Site including available mitigation, the vulnerability of occupants and preferred evacuation routes.

Flood warnings

The EA operates a flood warning service in all areas at risk of flooding; this is available on their website: <https://www.gov.uk/check-flood-risk>. The Site is located within an EA Flood Alerts and Warning coverage area (Alert Quickdial: 173293 and Warning Quickdial: 173222) so is able to receive alerts and/or warnings (Figure 11). All warnings are also available through the EA's 24 hour Floodline Service 0345 988 1188.

The EA aims to issue Flood Warnings 2 hours in advance of a flood event. Flood Warnings can provide adequate time to enable protection of property and evacuation from a Site, reducing risk to life and property.

Figure 11. EA Flood Warning Coverage for the local area (EA, 2023).



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Emergency evacuation

Where possible, a safe access and egress route with a 'very low' hazard rating from areas within the floodplain to an area wholly outside the 1 in 100 year flood event including an allowance for climate change should be demonstrated.

Based on the EA's Flood Zone Map the closest dry evacuation area within Flood Zone 1 is contained within the Site, to the western boundary. It is advised that evacuation from the premises would be the preferred option in a flood event if safe to do so. It is recommended that residents prepare to evacuate as soon as an EA Flood Warning is issued in order to completely avoid flood waters.

On-Site refuge

Evacuation should be the primary action in preference, however safe refuge could be sought at first floor level in a worst-case scenario as the residential areas of the development are situated on the first floor and above in the main dwelling and in the garage on the first floor.

Other relevant information

A Flood Warning and Evacuation Plan (FWEP) is recommended, and occupants should be signed up to receive EAs Flood Alerts and Warnings.

Registration to the Environment Agency's flood warning scheme can be done by following this link: <https://www.gov.uk/sign-up-for-flood-warnings>.

It is recommended that main communication lines required for contacting the emergency services, electricity sockets/meters, water supply and first aid stations and supplies are not compromised by flood waters. Where possible these should all be raised above the extreme flood level.

8. Conclusions and recommendations



Table 7. Risk ratings following implementation and subsequent maintenance of mitigation measures

Source of Flood Risk	Baseline	After Mitigation
River (fluvial) flooding	Low to Very Low	Very Low
Surface water (pluvial) flooding	Very Low	N/A
Groundwater flooding	Moderate to Low	Low to Negligible
Other flood risk factors present	No	N/A

The table below provides a summary of where the responses to key questions are discussed in this report. Providing the recommended mitigation measures are put in place it is likely that flood risk to this Site will be reduced to an acceptable level.

Table 8. Summary of responses to key questions in the report

Key sources of flood risks identified	Fluvial and Groundwater (see Section 4).
Are standard mitigation measures likely to provide protection from flooding to/from the Site?	Yes (see Section 7).
Is any further work recommended?	Yes
<p>Recommendations for mitigation are provided below, based upon the proposed development and the flood risk identified at the Site.</p> <ul style="list-style-type: none"> As there is a risk of flooding from fluvial sources, due to Flood Zone 2 being derived from the historic flood event documented at the Site, therefore the Finished Floor Levels (FFL) of the proposed development should be set 0.3 m above the surrounding ground levels. It is likely the flood mitigation measures recommended for fluvial risk will be sufficient to reduce the groundwater flood risk at the development. However specific 	

groundwater measures that may also be considered for the Moderate risk identified include:

- Waterproof tanking of the ground floor;
 - Interceptor drains;
 - Automatic sump and pump to extract flood water; and
 - Non-return flap valves on the proposed foul and surface water sewer lines.
- Occupants of the Site should be signed up to receive EA Flood Alerts and Flood Warnings.
 - A Flood Warning and Evacuation Plan (FWEP) is recommended to ensure persons using the Site can evacuate safely on receipt of a Flood Warning.
 - A Sustainable Drainage Strategy (SuDS) should be developed for the Site, for effective management of surface water runoff over the lifetime of the proposed development.

GeoSmart recommend the mitigation measures discussed within this report are considered as part of the proposed development where possible and evidence of this is provided to the Local Planning Authority as part of the planning application.

9. Further information



The following table includes a list of additional products by GeoSmart:

Additional GeoSmart Products			
✓	<p>Additional assessment:</p> <p>SuDSmart Report</p>		<p>The SuDSmart Report range assesses which drainage options are available for a Site. They build on technical detail starting from simple infiltration screening and work up to more complex SuDS Assessments detailing alternative options and designs.</p> <p>Please contact info@geosmartinfo.co.uk for further information.</p>
✓	<p>Additional assessment:</p> <p>EnviroSmart Report</p>		<p>Provides a robust desk-based assessment of potential contaminated land issues, taking into account the regulatory perspective.</p> <p>Our EnviroSmart reports are designed to be the most cost effective solution for planning conditions. Each report is individually prepared by a highly experienced consultant conversant with Local Authority requirements.</p> <p>Ideal for pre-planning or for addressing planning conditions for small developments. Can also be used for land transactions.</p> <p>Please contact info@geosmartinfo.co.uk for further information.</p>



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Glossary

General terms

BGS	British Geological Survey
EA	Environment Agency
GeoSmart groundwater flood risk model	GeoSmart's national groundwater flood risk model takes advantage of all the available data and provides a preliminary indication of groundwater flood risk on a 50m grid covering England and Wales. The model indicates the risk of the water table coming within 1 m of the ground surface for an indicative 1 in 100 year return period scenario.
Dry-Island	An area considered at low risk of flooding (e.g. In a Flood Zone 1) that is entirely surrounded by areas at higher risk of flooding (e.g. Flood Zone 2 and 3)
Flood resilience	Flood resilience or wet-proofing accepts that water will enter the building, but through careful design will minimise damage and allow the re-occupancy of the building quickly. Mitigation measures that reduce the damage to a property caused by flooding can include water entry strategies, raising electrical sockets off the floor, hard flooring.
Flood resistance	Flood resistance, or dry-proofing, stops water entering a building. Mitigation measures that prevent or reduce the likelihood of water entering a property can include raising flood levels or installation of sandbags.
Flood Zone 1	This zone has less than a 0.1% annual probability of river flooding
Flood Zone 2	This zone has between 0.1 and 1% annual probability of river flooding and between 0.1% and 0.5 % annual probability sea flooding
Flood Zone 3	This zone has more than a 1% annual probability of river flooding and 0.5% annual probability of sea flooding
Functional Flood Plain	An area of land where water has to flow or be stored in times of flood.
Hydrologic model	A computer model that simulates surface run-off or fluvial flow. The typical accuracy of hydrologic models such as this is $\pm 0.25\text{m}$ for estimating flood levels at particular locations.
OS	Ordnance Survey
Residual Flood Risk	The flood risk remaining after taking mitigating actions.

SFRA	Strategic Flood Risk Assessment. This is a brief flood risk assessment provided by the local council
SuDS	A Sustainable drainage system (SuDS) is designed to replicate, as closely as possible, the natural drainage from the Site (before development) to ensure that the flood risk downstream of the Site does not increase as a result of the land being developed. SuDS also significantly improve the quality of water leaving the Site and can also improve the amenity and biodiversity that a Site has to offer. There are a range of SuDS options available to provide effective surface water management that intercept and store excess run-off. Sites over 1 Ha will usually require a sustainable drainage assessment if planning permission is required. The current proposal is that from April 2014 for more than a single dwelling the drainage system will require approval from the SuDS Approval Board (SABs).

Aquifer Types

Principal aquifer	These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.
Secondary A aquifer	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.
Secondary B aquifer	Predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.
Secondary undifferentiated	Has been assigned in cases where it has not been possible to attribute either category A or B to a rock type due to the variable characteristics of the rock type.
Unproductive Strata	These are rock layers or drift deposits with low permeability that has negligible significance for water supply or river base flow.

NPPF (2023) terms

Exception test	Applied once the sequential test has been passed. For the exception test to be passed it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk and a site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.
Sequential test	Aims to steer new development to areas with the lowest probability of flooding.

Essential infrastructure	Essential infrastructure includes essential transport infrastructure, essential utility infrastructure and wind turbines.
Water compatible	Water compatible land uses include flood control infrastructure, water-based recreation and lifeguard/coastal stations.
Less vulnerable	Less vulnerable land uses include police/ambulance/fire stations which are not required to be operational during flooding and buildings used for shops/financial/professional/other services.
More vulnerable	More vulnerable land uses include hospitals, residential institutions, buildings used for dwelling houses/student halls/drinking establishments/hotels and sites used for holiday or short-let caravans and camping.
Highly vulnerable	Highly vulnerable land uses include police/ambulance/fire stations which are required to be operational during flooding, basement dwellings and caravans/mobile homes/park homes intended for permanent residential use.

Data Sources

Aerial Photography	Contains Ordnance Survey data © Crown copyright and database right 2023 BlueSky copyright and database rights 2023
Bedrock & Superficial Geology	Contains British Geological Survey materials © NERC 2023 Ordnance Survey data © Crown copyright and database right 2023
Flood Risk (Flood Zone/RoFRS/Historic Flooding/Pluvial/Surface Water Features/Reservoir/ Flood Alert & Warning)	Environment Agency copyright and database rights 2023 Ordnance Survey data © Crown copyright and database right 2023
Flood Risk (Groundwater)	GeoSmart, BGS & OS GW5 (v2.4) Map (GeoSmart, 2023) Contains British Geological Survey materials © NERC 2023 Ordnance Survey data © Crown copyright and database right 2023
Location Plan	Contains Ordnance Survey data © Crown copyright and database right 2023
Topographic Data	OS LiDAR/EA Contains Ordnance Survey data © Crown copyright and database right 2023 Environment Agency copyright and database rights 2023

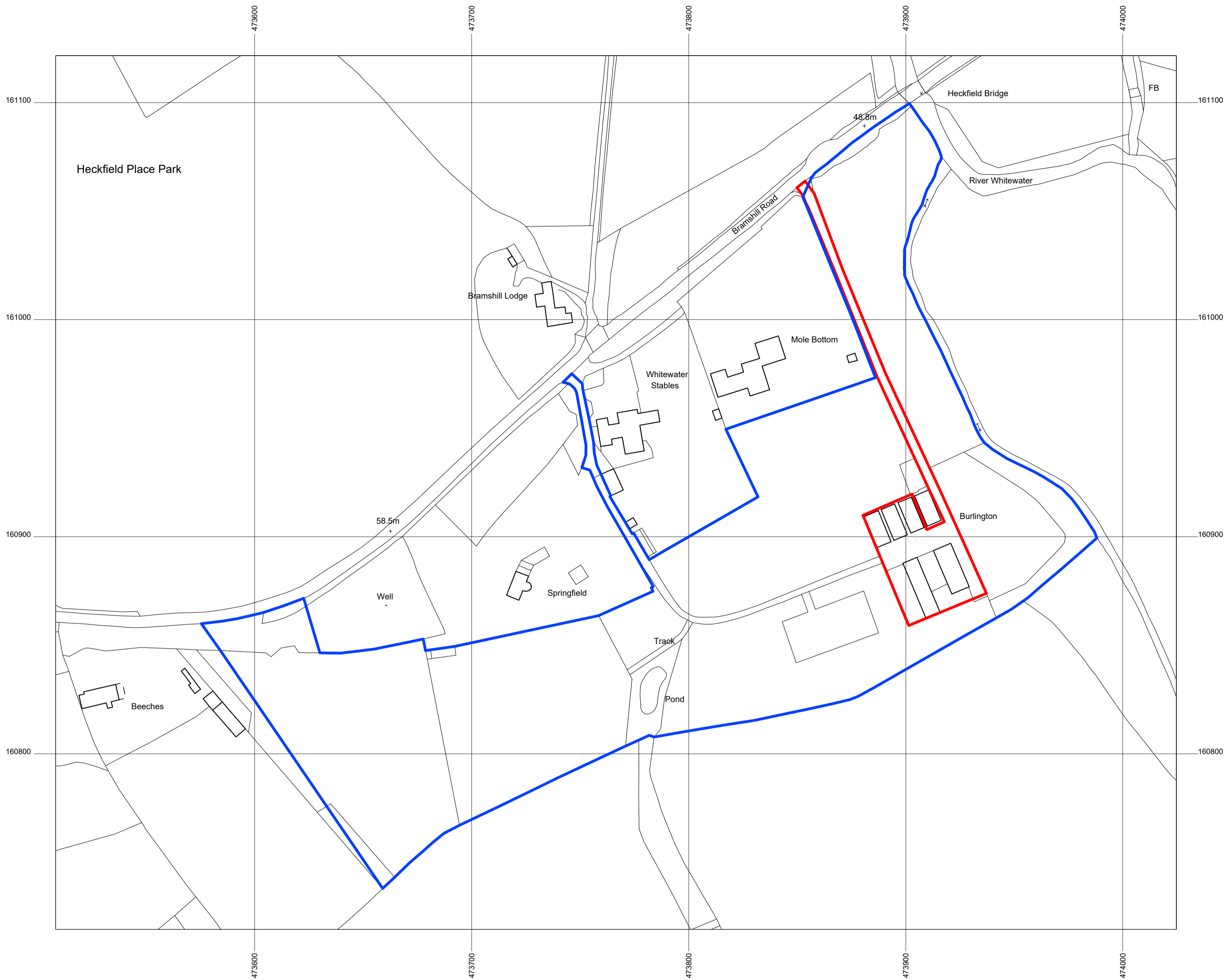
11. Appendices



Appendix A

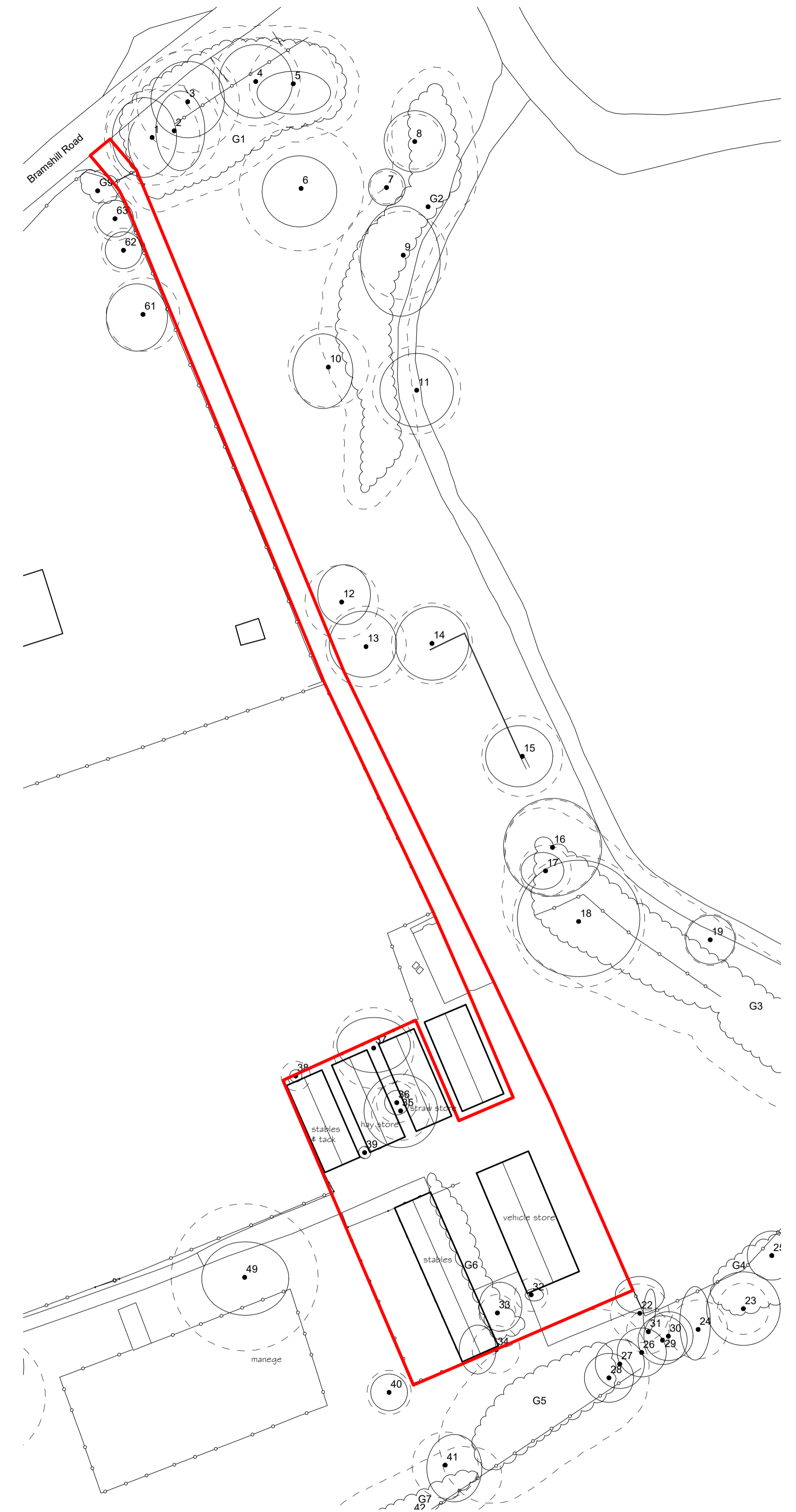
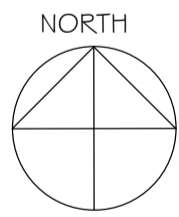
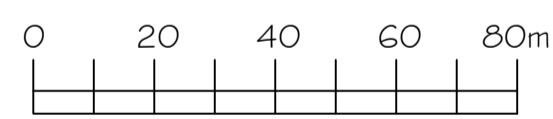


Site plans

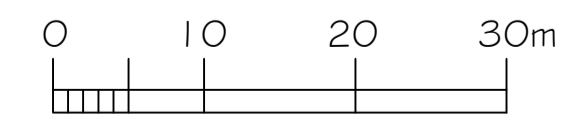


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LOCATION PLAN
SCALE 1:1250@A1

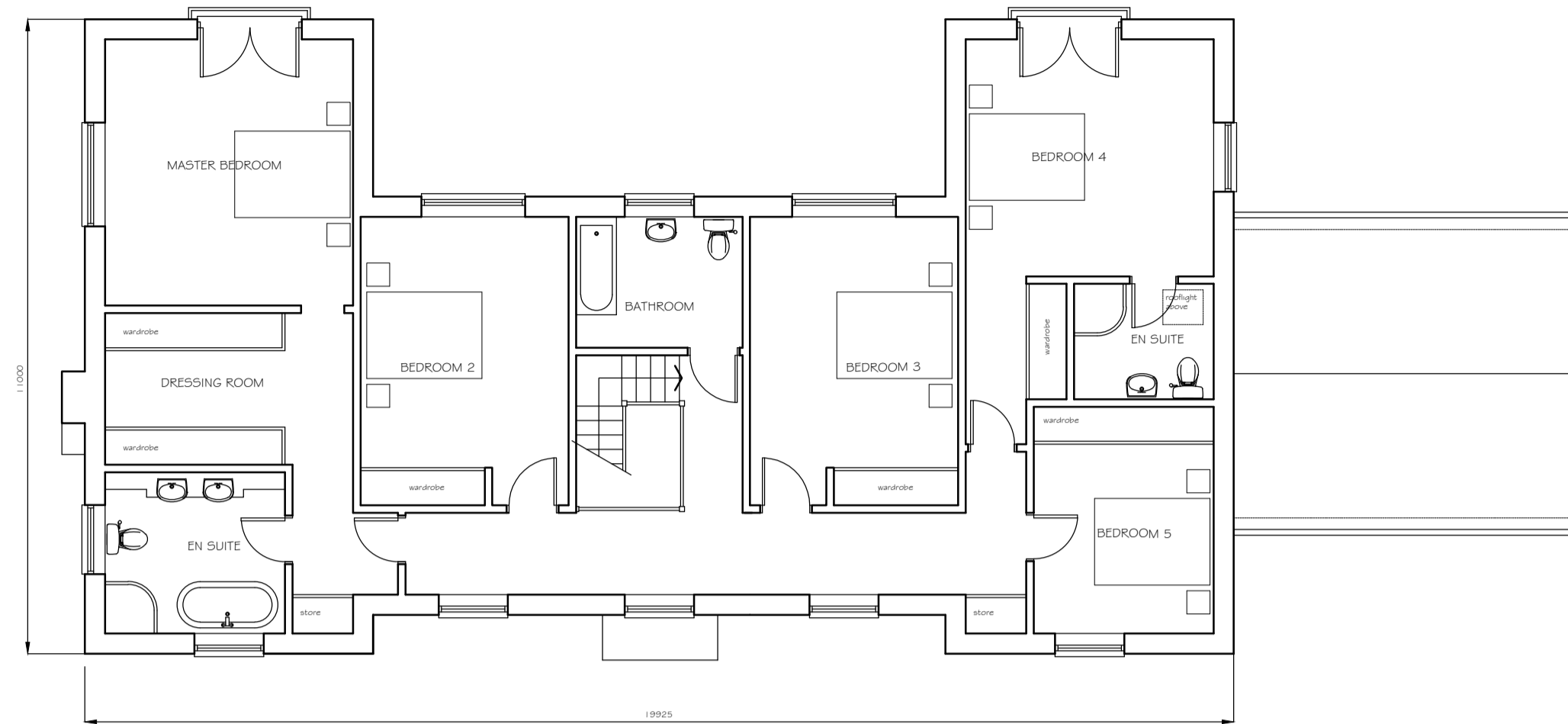
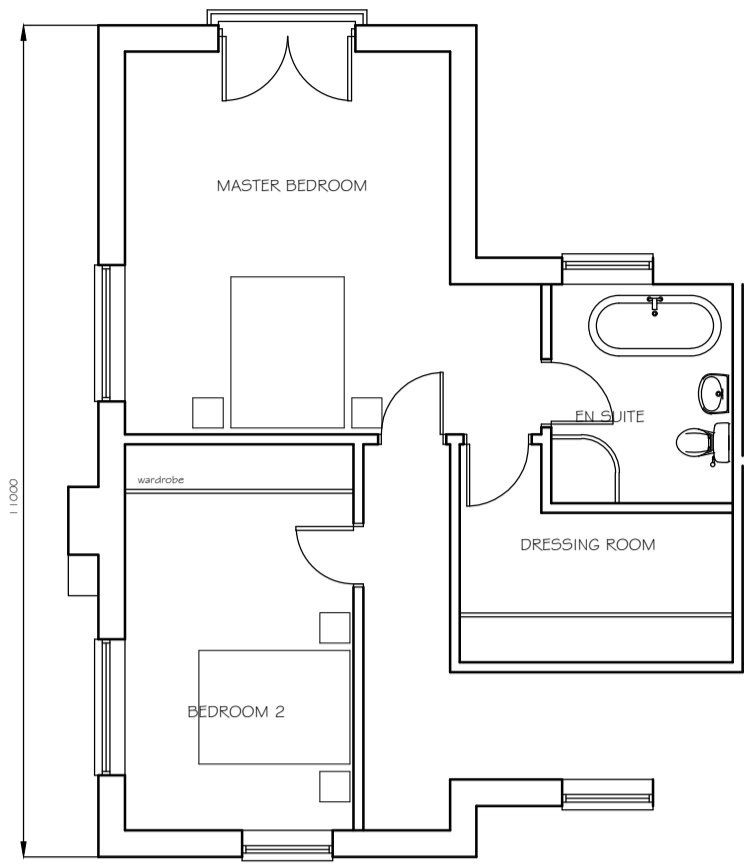


SITE PLAN
SCALE 1:500@A1

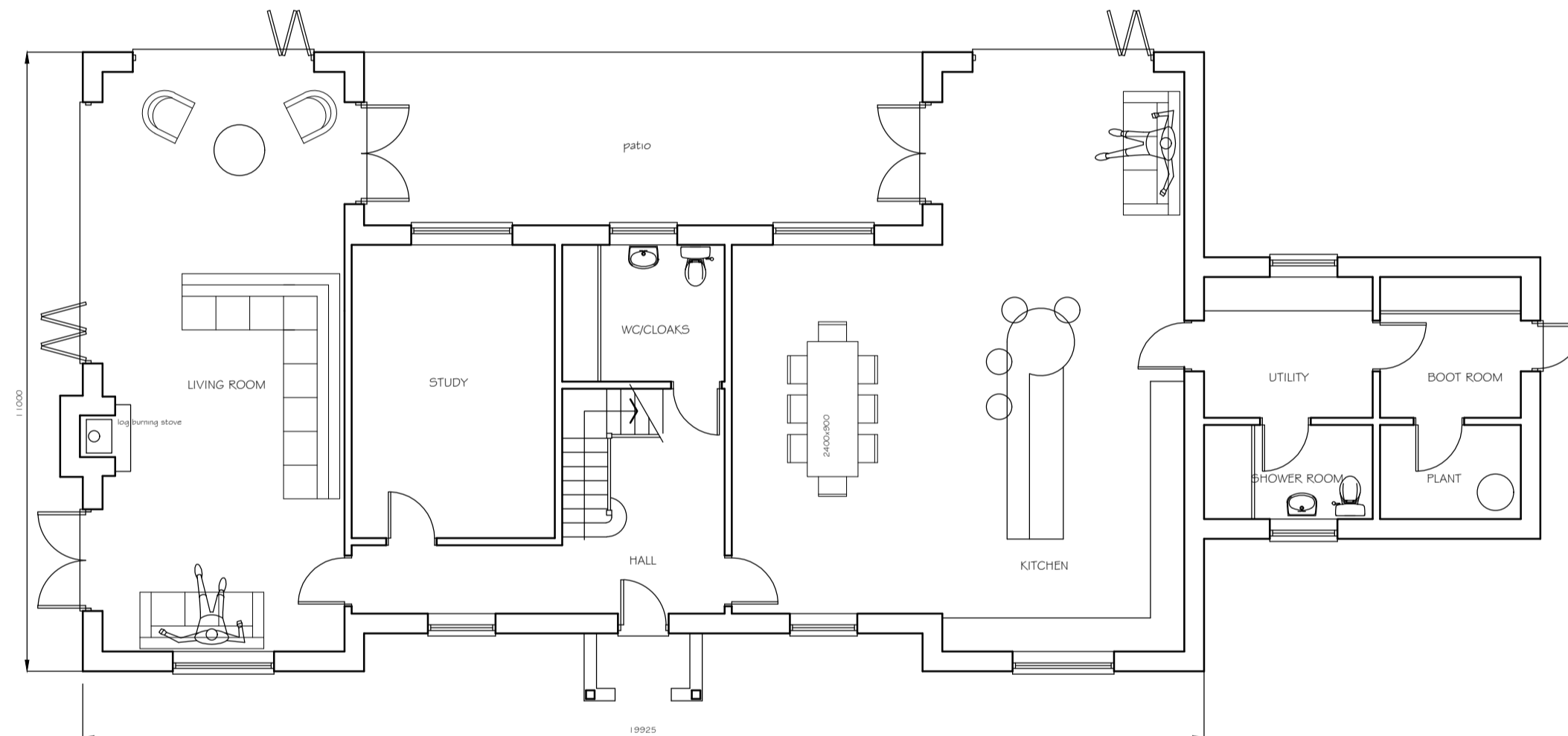


BURLINGTON
BRAMSHILL ROAD
HECKFIELD

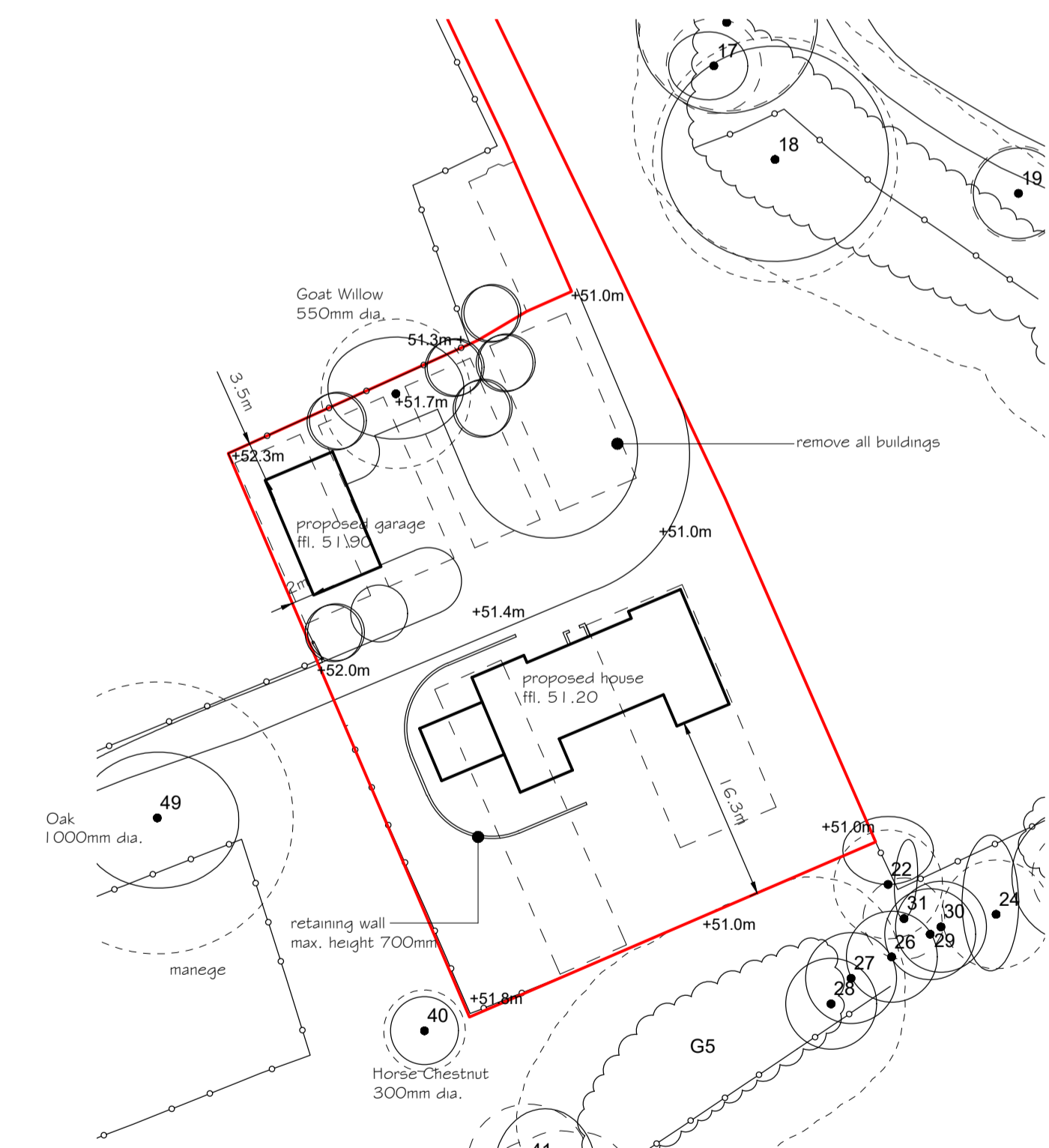
DATE: August 2023
DRAWING NO. P.O1 REV. -



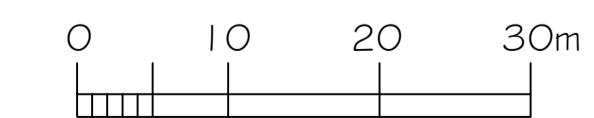
PROPOSED FIRST FLOOR



PROPOSED GROUND FLOOR



PROPOSED PART SITE PLAN
SCALE 1:500@A1



BURLINGTON
BRAMSHILL ROAD
HECKFIELD

DATE: November 2023
DRAWING NO. P.02 REV. -



PROPOSED FRONT ELEVATION (north)

PROPOSED SIDE ELEVATION (west)



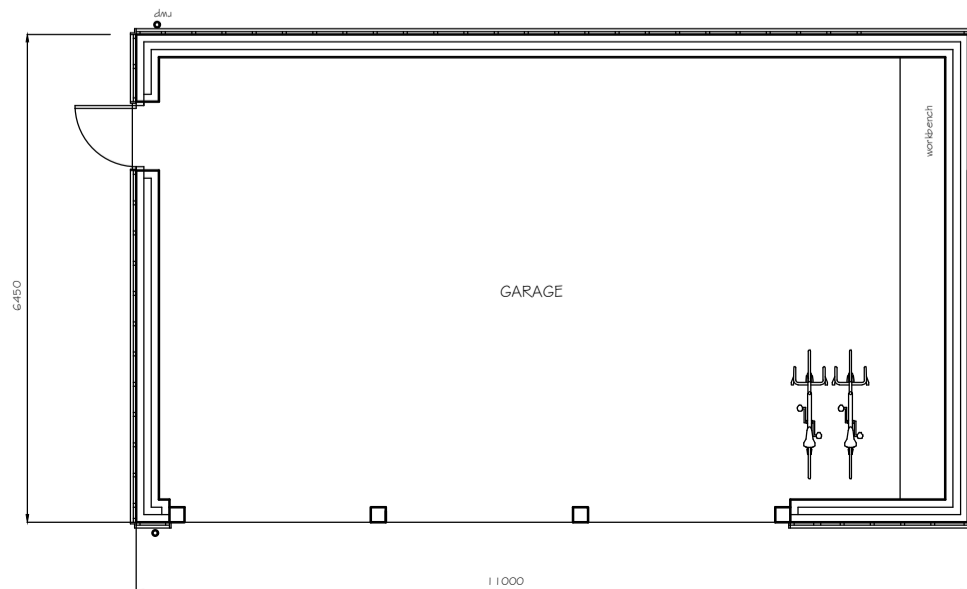
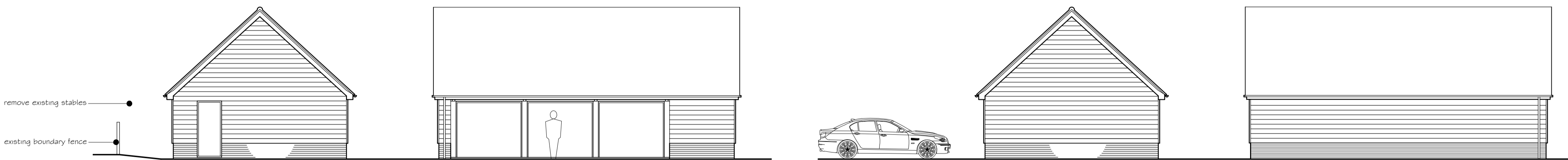
PROPOSED REAR ELEVATION (south)

PROPOSED SIDE ELEVATION (east)



ALTERNATIVE REAR ELEVATION

ALTERNATIVE SIDE ELEVATION

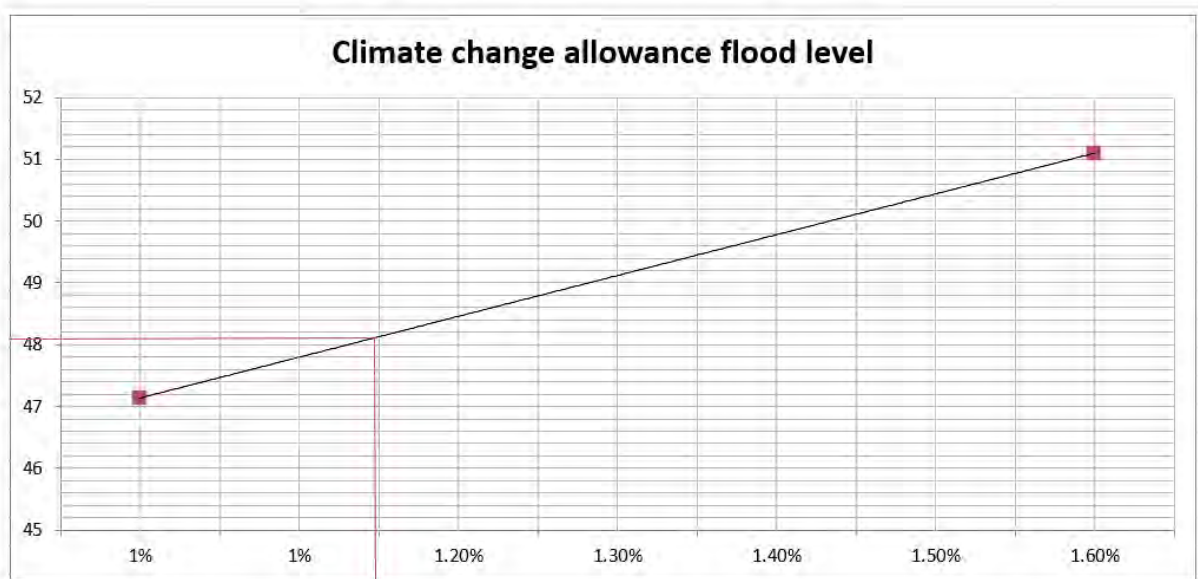


BURLINGTON
BRAMSHILL ROAD
HECKFIELD

DATE: November 2023
DRAWING NO. P.03 REV. -



Stage Discharge Graph





Thames Water sewer flooding history

Sewer Flooding

History Enquiry



Property Searches

GeoSmart Information Ltd

Bellstone

Search address supplied Whitewater House
Bramshill Road
Heckfield
Hook
RG27 0LA

Your reference 75557

Our reference SFH/SFH Standard/2021_4532558

Received date **1 November 2021**

Search date **1 November 2021**



Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13



searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk



0800 009 4540

Sewer Flooding

History Enquiry



Property Searches

Search address supplied: Whitewater House, Bramshill
Road, Heckfield, Hook, RG27 0LA

This search is recommended to check for any sewer flooding in a specific address or area

TWUL, trading as Property Searches, are responsible in respect of the following:-

- (i) any negligent or incorrect entry in the records searched;
- (ii) any negligent or incorrect interpretation of the records searched;
- (iii) and any negligent or incorrect recording of that interpretation in the search report
- (iv) compensation payments



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History of Sewer Flooding

Is the requested address or area at risk of flooding due to overloaded public sewers?

The flooding records held by Thames Water indicate that there have been no incidents of flooding in the requested area as a result of surcharging public sewers.

For your guidance:

- A sewer is “overloaded” when the flow from a storm is unable to pass through it due to a permanent problem (e.g. flat gradient, small diameter). Flooding as a result of temporary problems such as blockages, siltation, collapses and equipment or operational failures are excluded.
- “Internal flooding” from public sewers is defined as flooding, which enters a building or passes below a suspended floor. For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.
- “At Risk” properties are those that the water company is required to include in the Regulatory Register that is presented annually to the Director General of Water Services. These are defined as properties that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the Company’s reporting procedure.
- Flooding as a result of storm events proven to be exceptional and beyond the reference period of one in ten years are not included on the At Risk Register.
- Properties may be at risk of flooding but not included on the Register where flooding incidents have not been reported to the Company.
- Public Sewers are defined as those for which the Company holds statutory responsibility under the Water Industry Act 1991.
- It should be noted that flooding can occur from private sewers and drains which are not the responsibility of the Company. This report excludes flooding from private sewers and drains and the Company makes no comment upon this matter.
- For further information please contact Thames Water on Tel: 0800 316 9800 or website www.thameswater.co.uk



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DX 151280 Slough 13



searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk





0800 009 4540








Environment Agency LiDAR ground elevation data



Elevation on Site
(LiDAR Data)

 Client Site
 0.1m Contours

Elevation (mAOD)

-  46.1800
-  48.1880
-  50.1960
-  52.2040
-  54.2120

Disclaimer

This report has been prepared by GeoSmart in its professional capacity as soil, groundwater, flood risk and drainage specialists, with reasonable skill, care and diligence within the agreed scope and terms of contract and taking account of the manpower and resources devoted to it by agreement with its client and is provided by GeoSmart solely for the internal use of its client.

The advice and opinions in this report should be read and relied on only in the context of the report as a whole, taking account of the terms of reference agreed with the client. The findings are based on the information made available to GeoSmart at the date of the report (and will have been assumed to be correct) and on current UK standards, codes, technology and practices as at that time. They do not purport to include any manner of legal advice or opinion. New information or changes in conditions and regulatory requirements may occur in future, which will change the conclusions presented here.

This report is confidential to the client. The client may submit the report to regulatory bodies, where appropriate. Should the client wish to release this report to any other third party for that party's reliance, GeoSmart may, by prior written agreement, agree to such release, provided that it is acknowledged that GeoSmart accepts no responsibility of any nature to any third party to whom this report or any part thereof is made known. GeoSmart accepts no responsibility for any loss or damage incurred as a result, and the third party does not acquire any rights whatsoever, contractual or otherwise, against GeoSmart except as expressly agreed with GeoSmart in writing.

For full T&Cs see <http://geosmartinfo.co.uk/terms-conditions>

Important consumer protection information

This search has been produced by GeoSmart Information Limited, Suite 9-11, 1st Floor, Old Bank Buildings, Bellstone, Shrewsbury, SY1 1HU.

Tel: 01743 298 100

Email: info@geosmartinfo.co.uk

GeoSmart Information Limited is registered with the Property Codes Compliance Board (PCCB) as a subscriber to the Search Code. The PCCB independently monitors how registered search firms maintain compliance with the Code.

The Search Code:

- provides protection for homebuyers, sellers, estate agents, conveyancers and mortgage lenders who rely on the information included in property search reports undertaken by subscribers on residential and commercial property within the United Kingdom.
- sets out minimum standards which firms compiling and selling search reports have to meet.
- promotes the best practice and quality standards within the industry for the benefit of consumers and property professionals.
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services.
- By giving you this information, the search firm is confirming that they keep to the principles of the Code. This provides important protection for you.

The Code's core principles

Firms which subscribe to the Search Code will:

- display the Search Code logo prominently on their search reports.
- act with integrity and carry out work with due skill, care and diligence.
- at all times maintain adequate and appropriate insurance to protect consumers.
- conduct business in an honest, fair and professional manner.
- handle complaints speedily and fairly.
- ensure that products and services comply with industry registration rules and standards and relevant laws.
- monitor their compliance with the Code.

Complaints

If you have a query or complaint about your search, you should raise it directly with the search firm, and if appropriate ask for any complaint to be considered under their formal internal complaints procedure. If you remain dissatisfied with the firm's final response, after your complaint has been formally considered, or if the firm has exceeded the response timescales, you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). The Ombudsman can award compensation of up to £5,000 to you if he finds that you have suffered actual loss as a result of your search provider failing to keep to the Code.

Please note that all queries or complaints regarding your search should be directed to your search provider in the first instance, not to TPOs or to the PCCB.

TPOs contact details:

The Property Ombudsman scheme
Milford House
43-55 Milford Street
Salisbury
Wiltshire SP1 2BP
Tel: 01722 333306
Fax: 01722 332296
Email: admin@tpos.co.uk

You can get more information about the PCCB from www.propertycodes.org.uk.

Please ask your search provider if you would like a copy of the search code

Complaints procedure

GeoSmart Information Limited is registered with the Property Codes Compliance Board as a subscriber to the Search Code. A key commitment under the Code is that firms will handle any complaints both speedily and fairly. If you want to make a complaint, we will:

- Acknowledge it within 5 working days of receipt.
- Normally deal with it fully and provide a final response, in writing, within 20 working days of receipt.
- Keep you informed by letter, telephone or e-mail, as you prefer, if we need more time.
- Provide a final response, in writing, at the latest within 40 working days of receipt.
- Liaise, at your request, with anyone acting formally on your behalf.

If you are not satisfied with our final response, or if we exceed the response timescales, you may refer the complaint to The Property Ombudsman scheme (TPOs): Tel: 01722 333306, E-mail: admin@tpos.co.uk.

We will co-operate fully with the Ombudsman during an investigation and comply with his final decision. Complaints should be sent to:

Martin Lucass

Commercial Director

GeoSmart Information Limited

Suite 9-11, 1st Floor,

Old Bank Buildings,

Bellstone, Shrewsbury, SY1 1HU

Tel: 01743 298 100

martinlucass@geosmartinfo.co.uk

12. Terms and conditions, CDM regulations and data limitations



Terms and conditions can be found on our website:

<http://geosmartinfo.co.uk/terms-conditions/>

CDM regulations can be found on our website:

<http://geosmartinfo.co.uk/knowledge-hub/cdm-2015/>

Data use and limitations can be found on our website:

<http://geosmartinfo.co.uk/data-limitations/>