GeoSmart Information

FloodSmart

Flood Risk Assessment

Site Address

Land north-west of Mays Lane
Arkley
Barnet
EN5 2AH

Grid Reference

523113, 195135

Report Prepared for

Green Planning Studio LTD.
On behalf of:
Martin Casey

Date

2024-04-05

Report Status

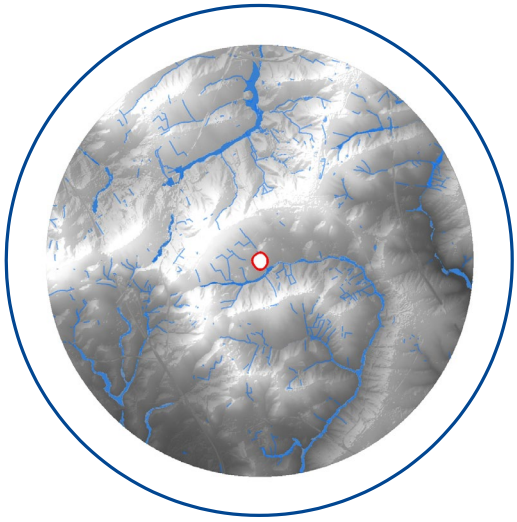
FINAL

Site Area

0.79 ha

Report Reference

81841R1



RISK – Very Low to Low

The Site is located in Flood Zone 1; EA mapping indicates that there is a Very Low risk of flooding from rivers and the sea. Surface water (pluvial) flood risks within the planned development area are Very Low to Low. Groundwater flood risks are Negligible and flooding risks from artificial sources (i.e. canals, reservoirs and sewers) are Low. Mitigation measures are recommended in this report to maintain the risks to an acceptable level over the lifetime of the development.

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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). 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[1]	After analysis[2]	After Mitigation[3]
River (fluvial) flooding	Very Low		N/A
Sea (coastal/tidal) flooding	Very Low		N/A
Surface water (pluvial) flooding	Very Low to High	Very Low to Low	Very Low
Groundwater flooding	Negligible		N/A
Other flood risk factors present	Yes (reservoirs)	Yes	Yes
Is any other further work recommended?	Yes	Yes	Yes (see below)

1 BASELINE risks assigned for the whole Site, using national risk maps, including the benefit of EA flood defences.

2 AFTER ANALYSIS modification of risk assessment based on detailed site specific analysis including some or all of the following: flood model data, high resolution mapping, building location, access routes, topographic and CCTV surveys.

3 AFTER MITIGATION risks include risks to proposed development / asset and occupants if mitigation measures recommended in this report are implemented, including the impacts of climate change.

*N/A indicates where mitigation is not required.

Summary of existing and proposed development

The Site is currently vacant grassland with no built infrastructure in place. There is an extensive area of hard standing located directly to the north-east of the Site.

Development proposals comprise the erection of two utility/dayrooms, two mobile homes and two touring caravans in the northeast of the Site. An access road (constructed of loose bound permeable hardstanding) is also proposed. Site plans are included within Appendix A.

Purpose of the report

This report has been prepared to support planning appeal 23/3816/FUL which was refused by Barnet Borough Council. The reasoning for refusal (in relation to flood risk and drainage) is related below.

"In the absence of a flood risk assessment and surface water drainage strategy it has not been demonstrated that this highly vulnerable form of development would be protected from potential sources including but not limited to surface water, groundwater, sewer, and artificial sources. The strategy also needs to confirm the appropriateness of the proposed soakaway in relation to adversely affecting surface water runoff and potential flood risk. In the absence of such, the proposal is contrary to the National Planning Policy Framework (2023), Policies SI 12 and SI 13 of the London Plan (2021), Policy CS13 of Barnet's Adopted Core Strategy (2012), Policy DM01 of the Local Plan Development Management Policies DPD (2012) and emerging local plan policy HOU07."

This report demonstrates that the Site is protected from all sources of flooding including and not limited to fluvial/tidal, surface water, groundwater and artificial sources of flooding. A SuDS strategy has been prepared separately to address the suitability of the proposed soakaway (ref: 81841.01R1).

Summary of flood risks

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

- No instances of historical flooding from any source have been identified according to information provided by the Environment Agency and the West London Strategic Flood Risk Assessment (Metis Consultants, 2024).

River (fluvial) and Sea (Estuarine/Coastal) flooding

According to the Environment Agency's (EA) Flood Map for Planning Purposes, the Site is located within a fluvial Flood Zone 1 (Low Probability).

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 Very Low risk of flooding from the neighbouring Dollis Brook.

Surface water (pluvial) flooding

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

However, flooding would not affect the area proposed for development during a 1 in 100-year plus climate change scenario event.

Pluvial flooding in all scenarios is confined to the western and northern boundaries of the Site.

A SuDS strategy has been prepared separately (ref: 81841.01R1) to ensure surface water runoff from the Site is managed over the lifetime of the proposed development.

Whilst baseline mapping indicates a Very Low to High. risk, as no areas of the proposed development are affected by pluvial flooding (see Figure 10) the flood risk has been reduced to Very Low / Low.

Groundwater flooding

Groundwater Flood Risk screening data indicates that there is a Negligible risk of groundwater flooding at the surface in the vicinity of the Site during a 1 in 100-year event.

A review of the conceptual ground model concurs that the groundwater flood risks are likely to be Negligible.

Artificial sources of flooding

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 that parts of the Site are at risk of reservoir flooding. The potential for a breach of a reservoir to occur and flooding affecting the Site is however considered to be low.
- Ordnance Survey (OS) data confirms there are no canals near to the Site.
- The Strategic Flood Risk Assessment (SFRA) (Metis Consultants, 2024) confirms no recorded instances of sewer flooding at or within the vicinity of the Site.

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

Recommendations

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

- It would be prudent to move the proposed touring caravan located in the northeast corner of the Site to the south / south-east to further reduce the risk of any flooding
- All caravans should remain tethered to the ground (where practical) as a precaution, in the unlikely event of a significant flood in the northeast of the Site.
- Occupants of the Site should be signed up to receive MET Office warnings in the event of a severe rainfall event.
- The ongoing management and maintenance of existing and any proposed drainage networks, under the riparian ownership of the developer, should be undertaken in perpetuity with the development.
- A Sustainable Drainage Strategy (SuDS) has been prepared separately by GeoSmart (ref: 81841.01R1) to manage surface water runoff from the Site. The proposed SuDS strategy should be implemented and maintained.

- It should be investigated whether the preferred CDA option has been implemented (the detention basin to the north of the Site). If so, the risk of pluvial flooding will likely be further reduced.

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 appeal.

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 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.

"*The 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. This means avoiding, so far as possible, development in current and future medium and high flood risk areas considering all sources of flooding including areas at risk of surface water flooding*" (Paragraph: 023. 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 publicly and commercially available flood risk data 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 West London Strategic Flood Risk Assessment (SFRA) (Metis Consultants, 2024) and the London Borough of Barent Surface Water Management Plan (SWMP) (AECOM, 2011) 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 risk 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.

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	Utility provider	OS Data
Historical	X	X	X		
River (fluvial) / Sea (tidal/coastal)	X	X	X		
Surface water (pluvial)	X	X	X		

Source of flooding	Datasets consulted				
	Commercial Flood Maps	Local Policy & Guidance Documents*	Environment Agency	Utility provider	OS Data
Groundwater	X	X			
Sewer		X		X	
Culvert/bridges		X			X
Reservoir		X	X		

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

Local policy and guidance

For this report, several documents have been consulted for local policy and guidance and relevant information is outlined below. It is noted not all of the below policies are relevant to flood risk and drainage, however have been included as they are referenced in the refusal letter (ref: 23/3816/FUL).

Barnet Core Strategy (2012):

Policy CS13: Ensuring the efficient use of natural resources.

We will seek to minimise Barnet's contribution to climate change and ensure that through the efficient use of natural resources the borough develops in a way which respects environmental limits and improves quality of life.

We will promote the highest environmental standards for development and through our SPDs on Sustainable Design and Construction and Green Infrastructure we will continue working to deliver exemplary levels of sustainability throughout Barnet in order to mitigate and adapt to the effects of a changing climate.

We will expect all development to be energy efficient and seek to minimise any wasted heat or power.

We will maximize opportunities for implementing new district-wide networks supplied by decentralised energy (including renewable generation) in partnership with key stakeholders in areas of major mixed use growth including town centres. Where feasible we will expect all development to contribute to new and existing frameworks.

Policy DM01: Protecting Barnet's character and amenity.

a. All development should represent high quality design which demonstrates high levels of environmental awareness and contributes to climate change mitigation and adaptation.

b. Development proposals should be based on an understanding of local characteristics. Proposals should preserve or enhance local character and respect the appearance, scale, mass, height and pattern of surrounding buildings, spaces and streets.

Barnet Surface Water Management Plan (AECOM, 2011):

Group2_002 is located to the north of the borough near Arkley and is approximately 0.9 km^2. This is a predominantly rural area with no critical infrastructure within the CDA boundary. The modelled 1 in 100-year output indicates that 34 non-deprived properties are at risk of shallow surface water flooding in this area. The main source of risk within this CDA is from the field drains which run alongside the urban area of Arkley to the north and through several farms to the south-east of the CDA. This CDA was validated against the EA FMfSW, no historic surface water flooding incidents have been recorded in this area.

To mitigate the flood risk in this area, the following preferred option has been derived. Construction of a combination of swale and detention basin on open space north of the farms will assist in attenuating runoff from the rural area.

West London Strategic Flood Risk Assessment (Metis Consultants):

5.3.2. Site-specific policies

Ensuring that land within development sites are safeguarded for potential flood mitigation use through the active consideration of predicted flood mapping from all sources at the master planning stage.

Developers must submit completed Flood Risk Assessments and Drainage Strategy (with supporting checklists) to demonstrate compliance with requirements detailed in Sections 2 and 4 for all Major development proposals.

Drainage Strategies with the supporting checklist must be provided for all Minor developments and for Change of Use proposals if they impact the proposed development's current drainage regime. Site-specific Flood Risk Assessments with the accompanying checklist must be provided for Minor developments and Change of Use proposals if they:

- Are outside of Flood Zone 1.
- Are inside an EA defined area with a critical drainage problem.
- Change the existing footprint of the building(s).
- Are at risk from any other sources of flooding.

As part of a submitted development proposal, developers must provide evidence to the LPA to demonstrate that the Sequential Test has been undertaken. Developers must also provide evidence that an on-site sequential approach has been taken to direct vulnerable uses to the lowest risk parts of the development site.

Where development is proposed for sites within Flood Zones 3a (surface water), evidence must be submitted to demonstrate that:

- There will be no increase of flood risk to properties outside of the development boundary.
- Consultation has been undertaken with the relevant LLFA to consider potential wider impacts or benefits the development could have on the local surface water catchment.
- Relevant strategic documents (such as the Thames CFMP, LFRMS and SWMP) have been reviewed.
- The LLFA has been consulted to determine if the development should contribute to any catchment wide flood alleviation schemes being considered by the LLFA (such as a S106 contribution to wider catchment flood risk management infrastructure).
- Development should maximise the use of open spaces to ensure spaces for water to flow during times of flood.
- Developments that seek to increase impermeable surfaces within a site, including small areas such as front gardens, will be resisted where appropriate.
- Developers should aim to incorporate permeable paving in hardstanding areas to provide flood mitigation benefits in new and existing developments. In areas where the geology does not facilitate infiltration (e.g. areas underlain with clay), permeable paving should be underlain with gravel or feature an underground storage system.
- Development proposed in 'dry islands' should be designed for safe access and egress in a flood event. Dry islands are considered flood risk areas due to the potential loss of important local services during flood events and lack of safe access routes. They require safe access and egress routes to be developed for the lifetime of the property, factoring in the impacts of climate change.

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).

3. Site analysis

Site information

The Site is located in Barnet in a setting of commercial and residential land use at National Grid Reference TQ 23113, 95135.

Figure 1. Aerial imagery of the Site (Bluesky, 2024)

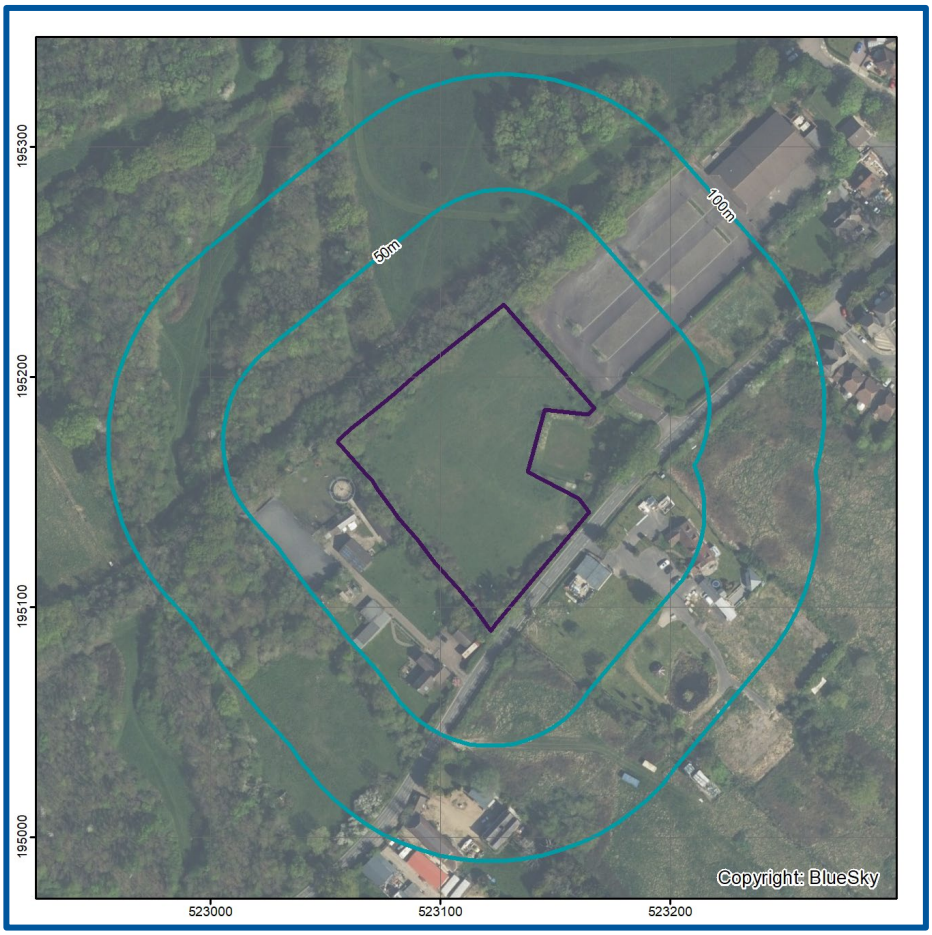
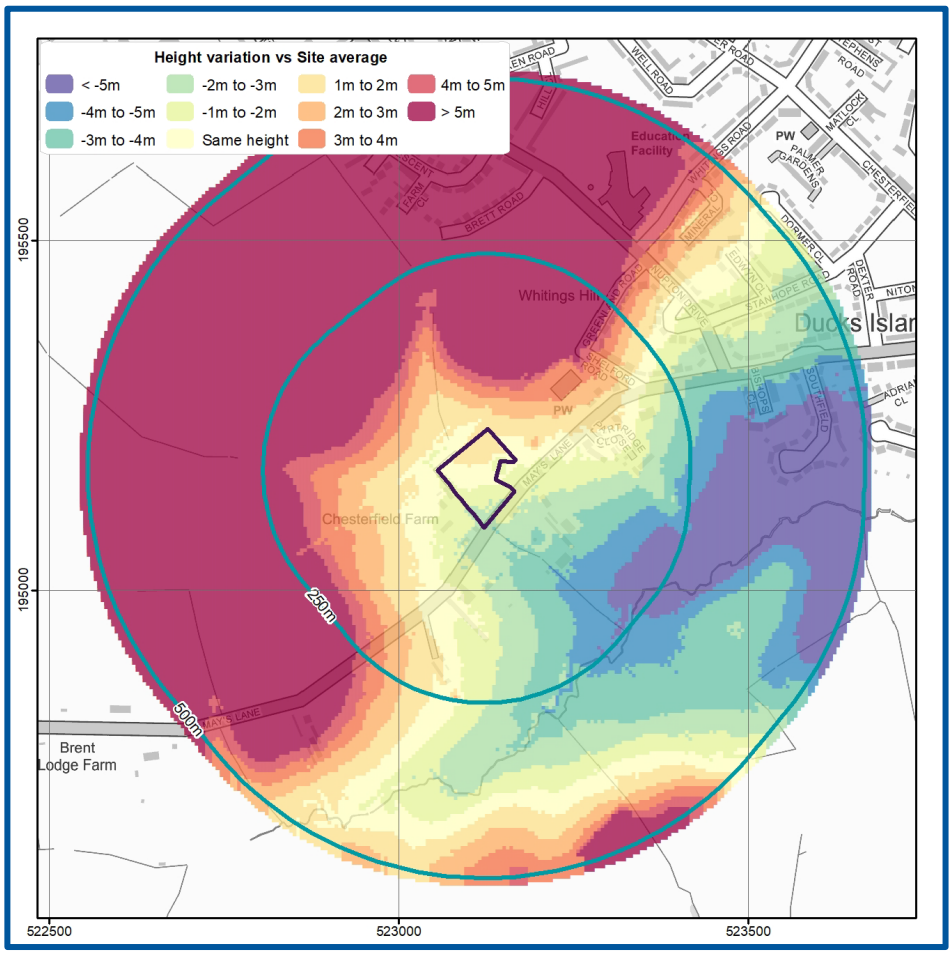


Figure 2 indicates that ground levels within 500m of the Site typically fall in a south easterly to easterly direction.

The general ground levels on the Site are between 89.16 and 92.41 mAOD with the Site falling gradually in a southerly 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 B).

Figure 2. Site Location and Relative Elevations (GeoSmart, 2024)



Development

The Site is currently vacant grassland with no built infrastructure in place. There is a large area of hardstanding (parking area) located directly to the north-east of the Site.

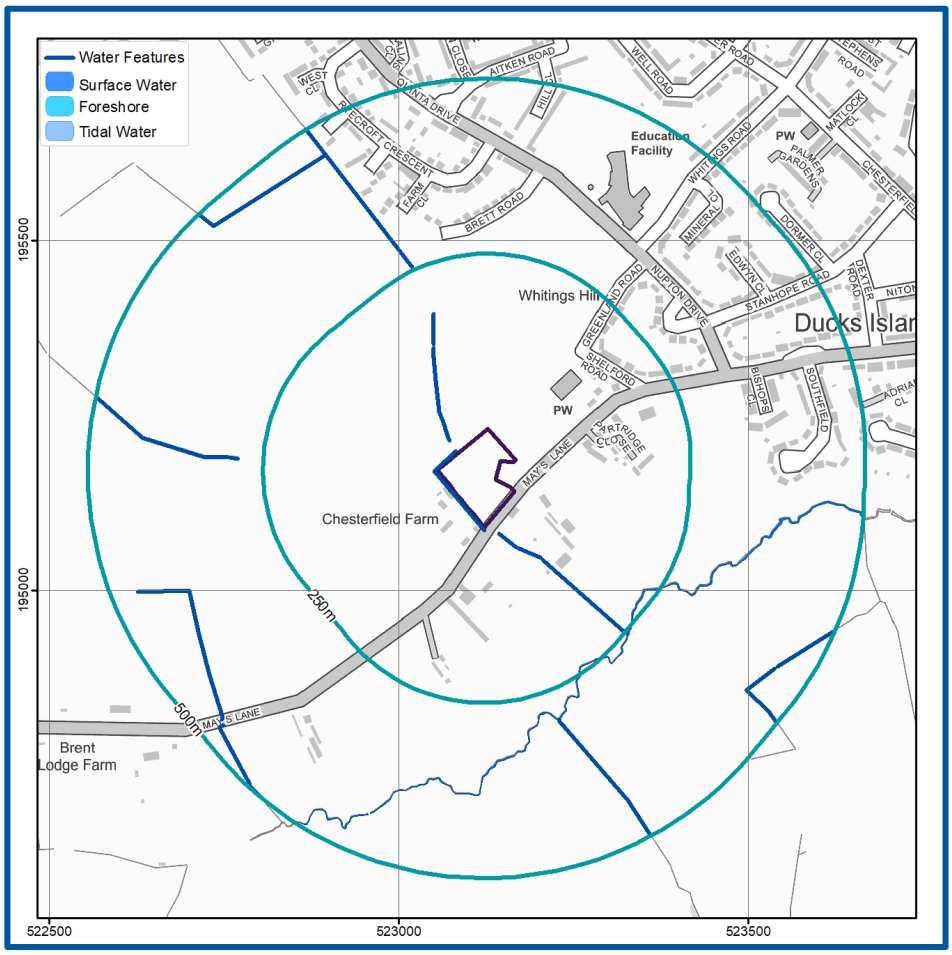
Development proposals comprise the erection of two utility/dayrooms, two mobile homes and two touring caravans in the northeast of the Site. An access road (constructed of loose bound permeable hardstanding) is also proposed. Site plans are included within Appendix A.

The effect of the overall development will result in an increase in number of occupants and/or users of the Site and will result in the change of use, nature or times of occupation. According to Annex 3 of the NPPG (2022), the vulnerability classification of the proposed development is Highly 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 3. Surface water features (EA, 2024)



Dollis Brook runs adjacent to the western Site boundary, flowing towards the south-east before joining a natural water course, approximately 250 m from the Site, which flows towards the south-west.

It appears that some water from the Dollis Brook collects in a pond approximately 220m north of the Site, associated with Whiting's Hill.

There are several drainage ditches located within 500m of the Site.

A culvert is noted under Mays Lane, approximately 480m southwest of the Site.

Proximity to relevant infrastructure

No relevant infrastructure has been identified within the vicinity of the Site.

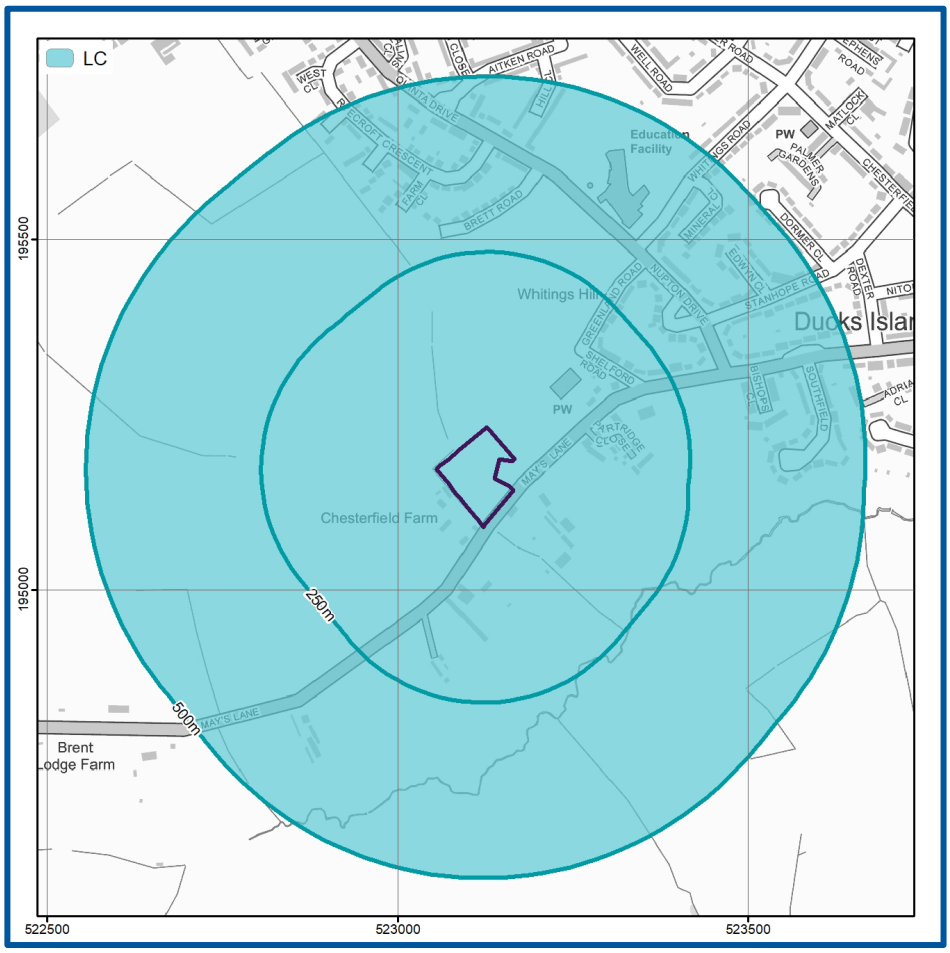
Hydrogeological features

British Geological Survey (BGS) mapping indicates the absence of any superficial deposits beneath the Site (BGS, 2024).

Figure 4. Superficial Geology (BGS, 2024)

BGS mapping indicates that the underlying bedrock geology (Figure 5) consists of the London Clay Formation (LC) (BGS, 2024) which is classified as an Unproductive Strata (EA, 2024).

Figure 5. Bedrock Geology (BGS, 2024)



Geological conditions

A review of the BGS borehole database (BGS, 2024) indicates there are no relevant boreholes within the vicinity of the Site from which the mapped geology and depth to groundwater can be confirmed.

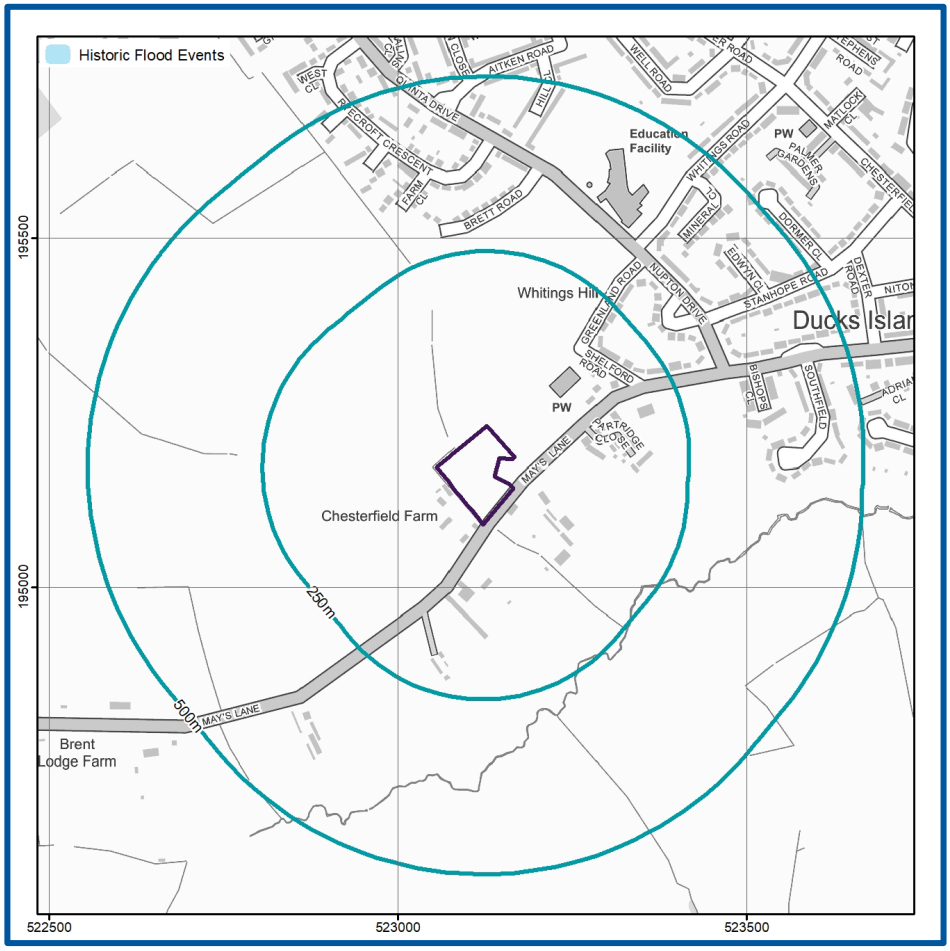
4. Flood risk to the development

Historical flood events

According to the EA's Historical Flood Map (Figure 6) and the online mapping of the West London SFRA (2024), there have been no recorded flooding events which have affected 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 6. EA Historical Flood Map (EA, 2024)

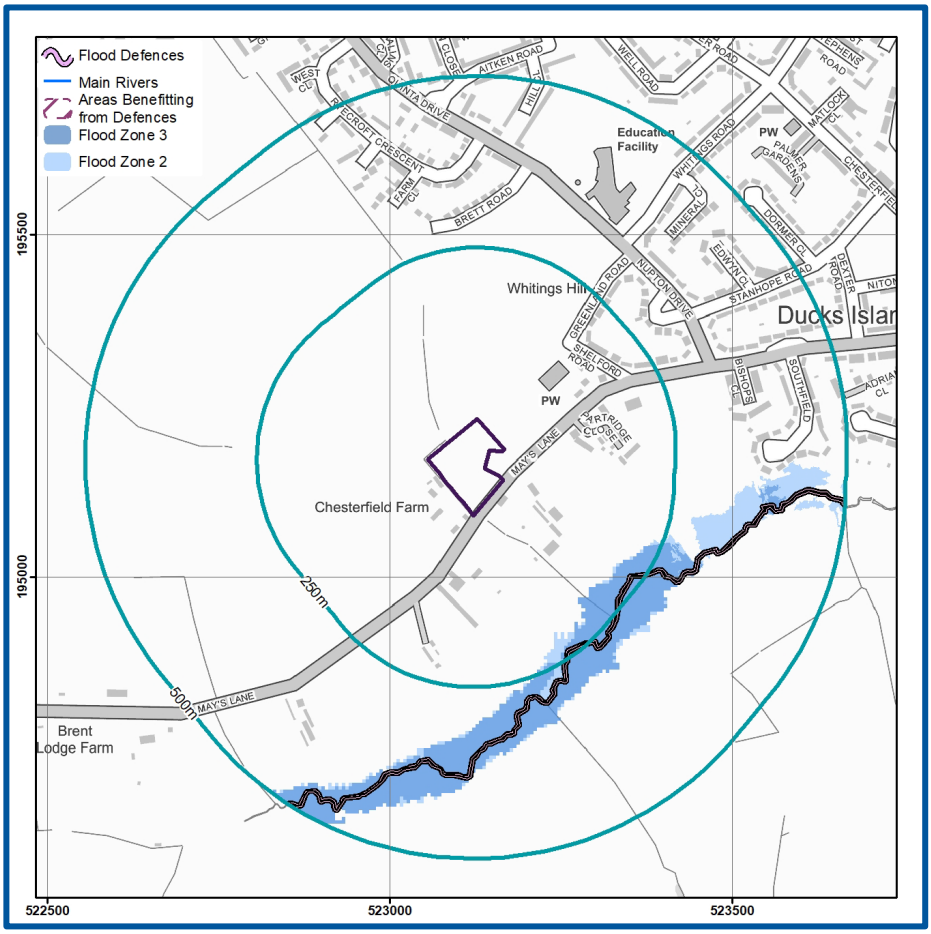


Rivers (fluvial) / Sea (coastal) / Estuarine (tidal) flooding

According to the EA's Flood Map for Planning Purposes (Figure 7), the Site is located within fluvial Flood Zone 1 and is therefore classified as having a Low probability of fluvial flooding from Dollis Brook.

Flood defences are present on the main tributary of Dollis Brook, approximately 200m south of the Site in the form of natural high ground. These are designed to provide a 1 in 20 year standard of protection.

Figure 7. EA Flood Map for Planning Purposes (EA, 2024)



Guidance

As defined in the NPPF (2023):

Ignoring the presence of any defences, land located in a Flood Zone 1 is considered to have a Low probability of flooding, with less than a 1 in 1000 annual probability of fluvial or coastal flooding in any one year.

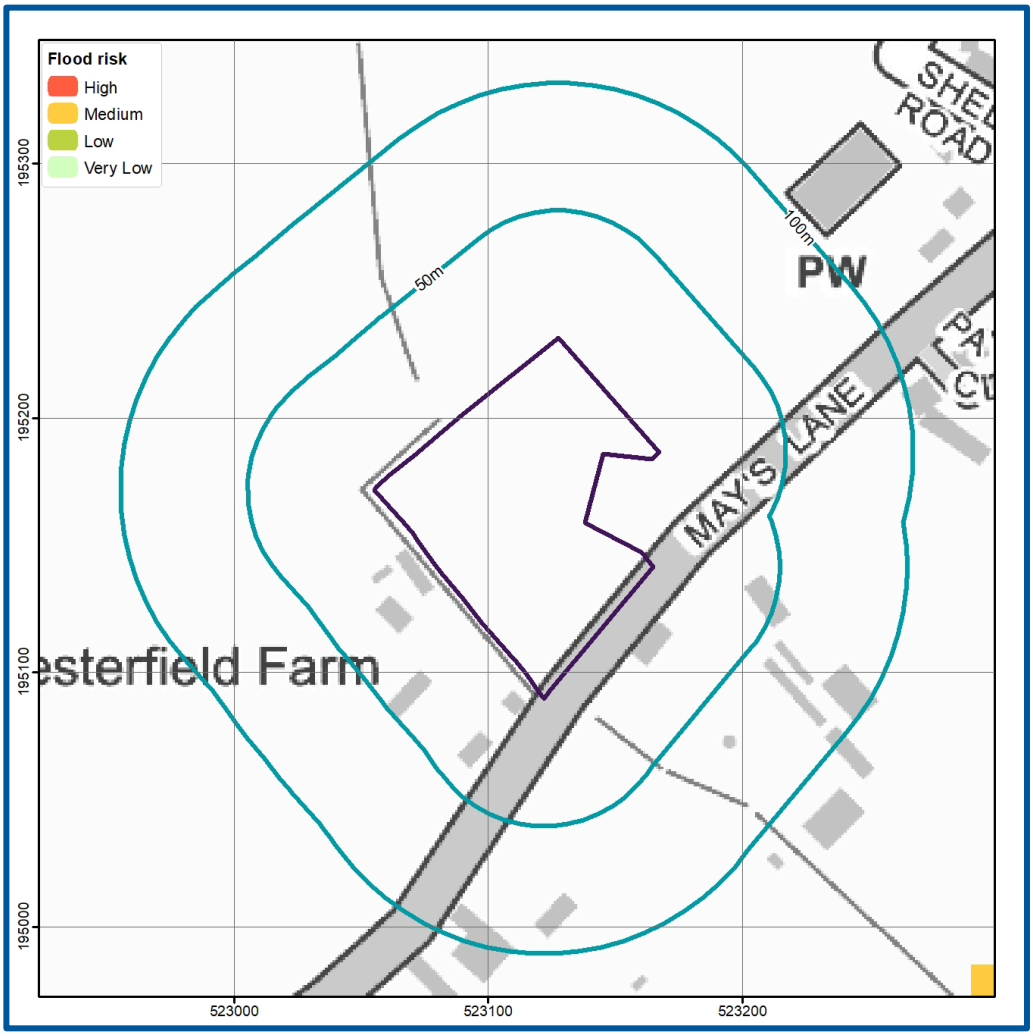
Development of all uses of land is appropriate in this zone (see glossary for terminology).

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 Sea (RoFRS) map (Figure 8), which considers the type, condition and crest height of flood defences, the Site has a Very Low risk of flooding from the nearby watercourse, Dollis Brook.

Figure 8. Risk of Flooding from Rivers and Sea map (EA, 2024)

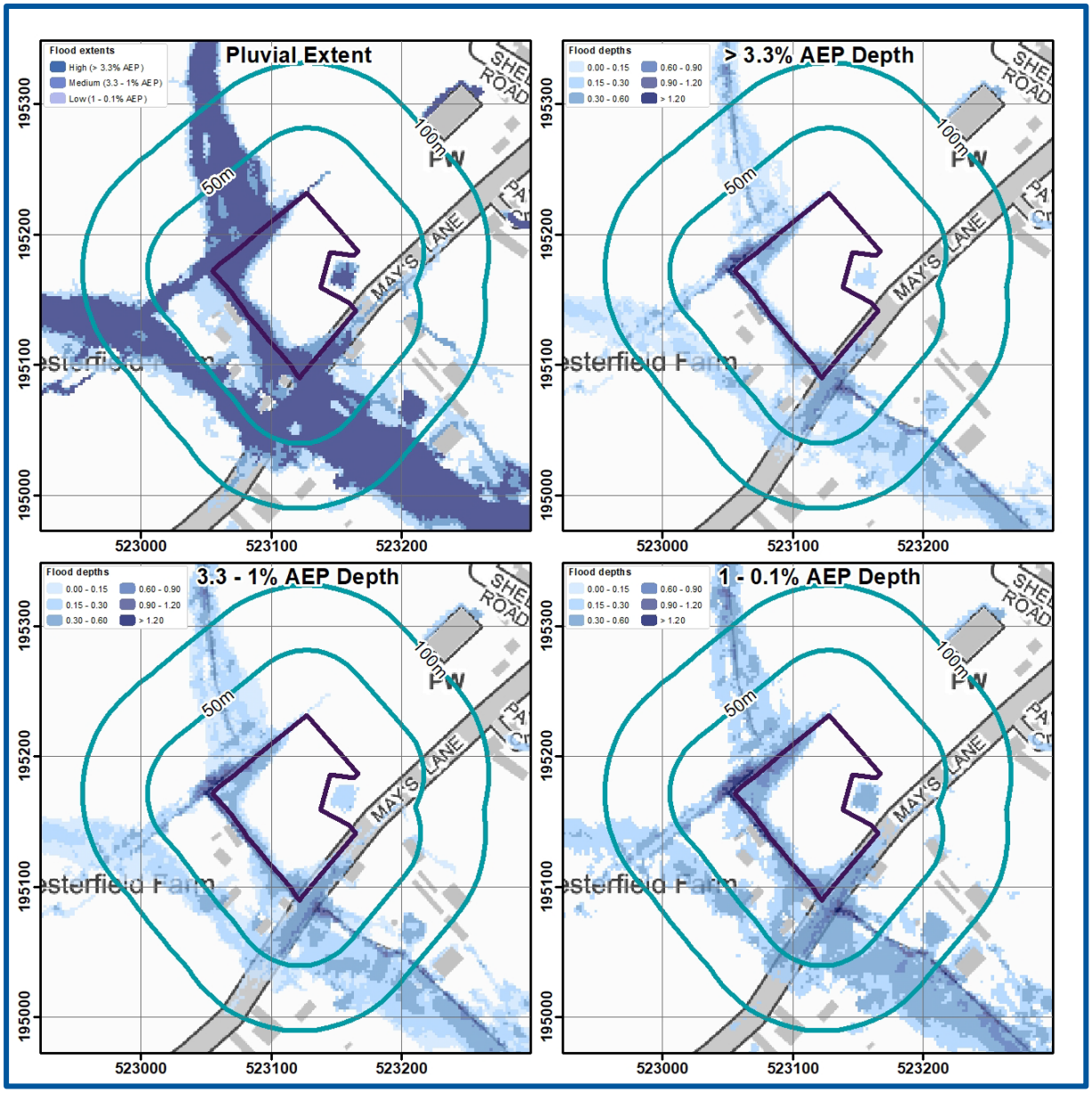


Surface water (pluvial) flooding

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 rivers and coastal floodplains.

According to the EA's Risk of Flooding from Surface Water (pluvial) flood mapping (Figure 9), the Site is at a variable risk of pluvial flooding ranging from Very Low to High.

Figure 9. EA surface water flood extent and depth map (EA, 2024)



Guidance

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%).
- Low risk - chance of flooding of between a 1 in 1000 & 1 in 100 (0.1% and 1%).
- Medium risk - chance of flooding of between a 1 in 100 and 1 in 30 (1% and 3.3%).
- High risk - chance of flooding of greater than 1 in 30 (3.3%).

Although the wider Site is deemed to be at Very Low to High risk of flooding, Figure 10 illustrates that the area proposed for development (positioned in the north-eastern corner of the Site) will remain unaffected up to and including the 1 in 1000 year flood event, although the Site access may be susceptible to localised flooding during this event.

High risk / frequency scenario (3.3% AEP)

Flooding is anticipated on Site, albeit confined to the northern and western boundaries of the Site, where flood depths could be up to 0.6m. Flood depths of up to 0.9m are anticipated within Dollis Brook. There is a small area of ponding adjacent to the southeastern boundary, however depths remain shallow up to a maximum of 0.3m. The area proposed for development remains unaffected.

Medium risk / frequency scenario (3.3 – 1% AEP)

The area proposed for development continues to remain unaffected, with the most significant flooding confined to the western boundary of the Site. Flood depths in this area range between 0.6m and 0.9m, with some flooding greater than 1.20m anticipated within the Brook close to the northwestern Site boundary. The water ponding adjacent to the southeast of the Site increases in depth to 0.6m.

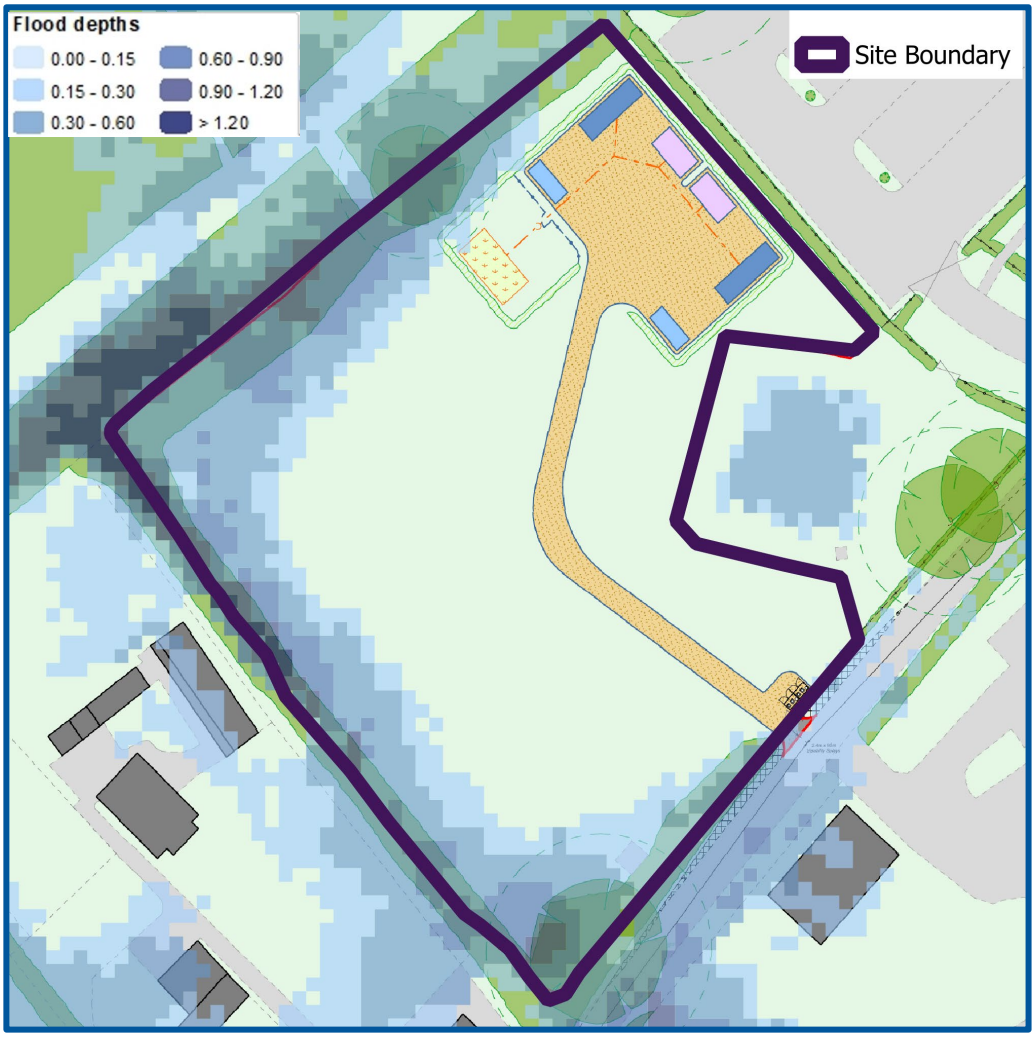
Low risk / frequency scenario (1 – 0.1% AEP)

The greatest flood depths are again confined to the areas adjacent to Dollis Brook, on the western and southern boundaries of the Site. No development is proposed in these areas and landscaped areas on the western boundary will experience flooding depths of up to 0.90m, but generally are no greater than 0.6m in depth. The touring caravan in the northeast of the Site is near an area prone to flooding with depths up to 0.3m in the Low-risk scenario. Access roads to the south of the Site are likely to be flooded to a maximum depth of 0.3m where access is proposed.

The SFRA does not indicate any reported incidents of historical surface water flooding within 100 m of the Site and confirms the Site is located within a Critical Drainage Area (Group2_002 – Arkley) (CDA)[1] (Metis Consultants, 2024).

[1] 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.

Figure 10. EA surface water flood depths relative to the proposed development area (0.1% AEP) (EA, 2024)



In summary, given that the area proposed for development remains unaffected during the Low-risk / frequency flooding scenario (1 in 1000 year event) and reflecting the planned implementation of a sustainable drainage (SuDS) strategy to manage surface water runoff (as described in GeoSmart report reference: 81841.01R1) the risk of pluvial flooding has been reduced to Very Low to Low.

Guidance

According to EA's surface water flood risk map the following advisory guidance applies to the area proposed for development as a precautionary measure, as the touring caravan is located in close proximity to an area affected in the Low risk (0.1% AEP) scenario:

Flood Depths:

- 0.15 to 0.3 m - Flooding would: typically exceed kerb height, likely exceed the level of a damp-proof course, cause property flooding in some areas.

Climate change factors

Paragraph 002 of the National Planning Practice Guidance (August 2022) requires consideration of the 1% AP (1 in 100 year) event, including an appropriate allowance for climate change.

As the Site is located within the London Management Catchment and the proposed development is classed as Highly Vulnerable, where the proposed lifespan is approximately 100 years. years, the Upper End (40%) allowance is required to determine a suitable climate change factor to apply to rainfall data.

The 0.1% AP (1 in 1000 year) surface water flooding event has been used as a proxy in this instance for the 1% AP (1 in 100 year) plus climate change event, where no flooding is expected in the area proposed for development.

Surface water flooding flow routes

Analysis of OS mapping, ground elevation data and the EA's pluvial flow route mapping in the 1 in 1000-year (Low probability) event confirms the Site is located on a potential overland flow route, which is likely associated with Dollis Brook.

The 1 in 1000-year (low probability) event indicates the extent of flooding in a worst-case future 100 year with climate change scenario, where a flood flow route does develop within the vicinity of the Site.

During a 1 in 100-year event the majority of of flow velocities are greater than 2.0 m/s. The flows are unlikely toaffect the buildings and/or access routes to the Site.

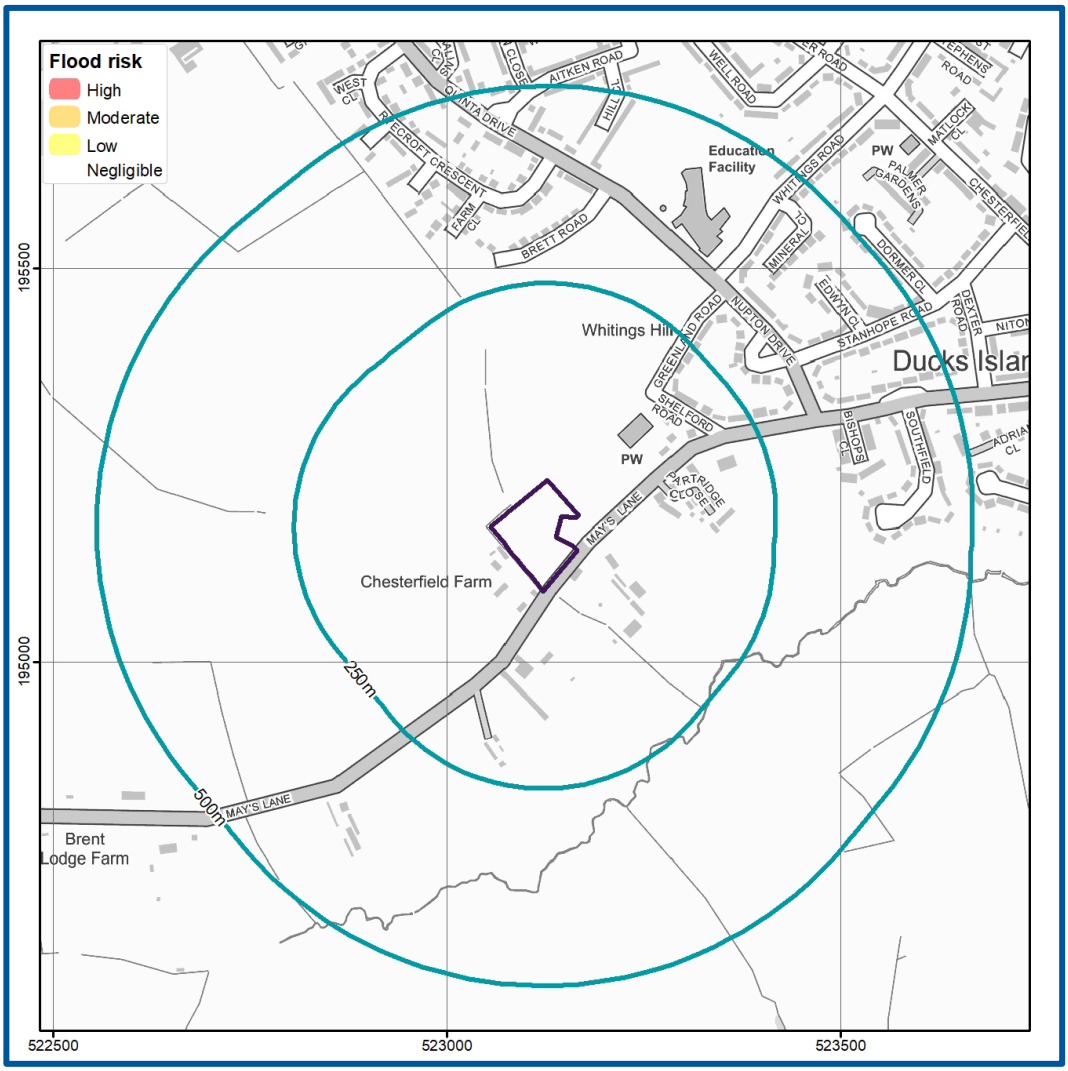
A review of the Site plans, topography and the EA's Risk of Flooding from Surface Water Direction mapping indicates any overland flows on the Site would not be obstructed by the proposed development and occur across non-essential areas of the Site.

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 11) indicates there is a Negligible risk of groundwater flooding at surface in the vicinity of the Site.

Figure 11. GeoSmart GW5 Groundwater Flood Risk Map (GeoSmart, 2024)



Mapped classes within the screening map 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.

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.

It is understood there are no existing basements, and a basement is not proposed as part of the development.

A soakaway feature is currently proposed to manage Site drainage; however, it is considered unlikely that a soakaway will be suitable, due to the mapped presence of low permeability clay near to ground surface. GeoSmart's SuDS report (ref: 81841.01R1) assesses the suitability of the Site in relation to the drainage hierarchy.

According to a review of the hydrogeology (Section 3), the Site is underlain low permeability bedrock. There is therefore unlikely to be a significant aquifer beneath the Site and there is unlikely to be a mechanism for groundwater flooding at the Site.

There are no nearby BGS boreholes from which the underlying groundwater depth can be inferred.

Spring lines have not been identified in close proximity to the Site.

The hydrogeological characteristics suggest there is unlikely to be a shallow groundwater table beneath the Site.

The baseline groundwater flood risk rating is Negligible and following the Site specific assessment, the risk is considered to remain as Negligible.

Guidance
Negligible Risk - There will be a remote 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. Sea level rises of between 0.4m and 1m are predicted

by 2100, leading to a rise in average groundwater levels in the adjacent coastal aquifer systems, and potential increases in water levels in the associated drainage systems. The 'backing up' of groundwater levels from both coast and tidal estuary locations may extend a significant distance inland and affect infrastructure previously constructed above average groundwater levels.

The impact of climate change on groundwater levels beneath the Site is linked to the predicted risk in both peak river levels and sea levels and also the variation in rainfall recharge which is uncertain.

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

The online mapping of the SFRA has identified no incidences or modelled incidences of flooding as a result of surcharging sewers within the vicinity of the Site (Metis Consultants, 2024).

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 Thames Water.

Culverts and bridges

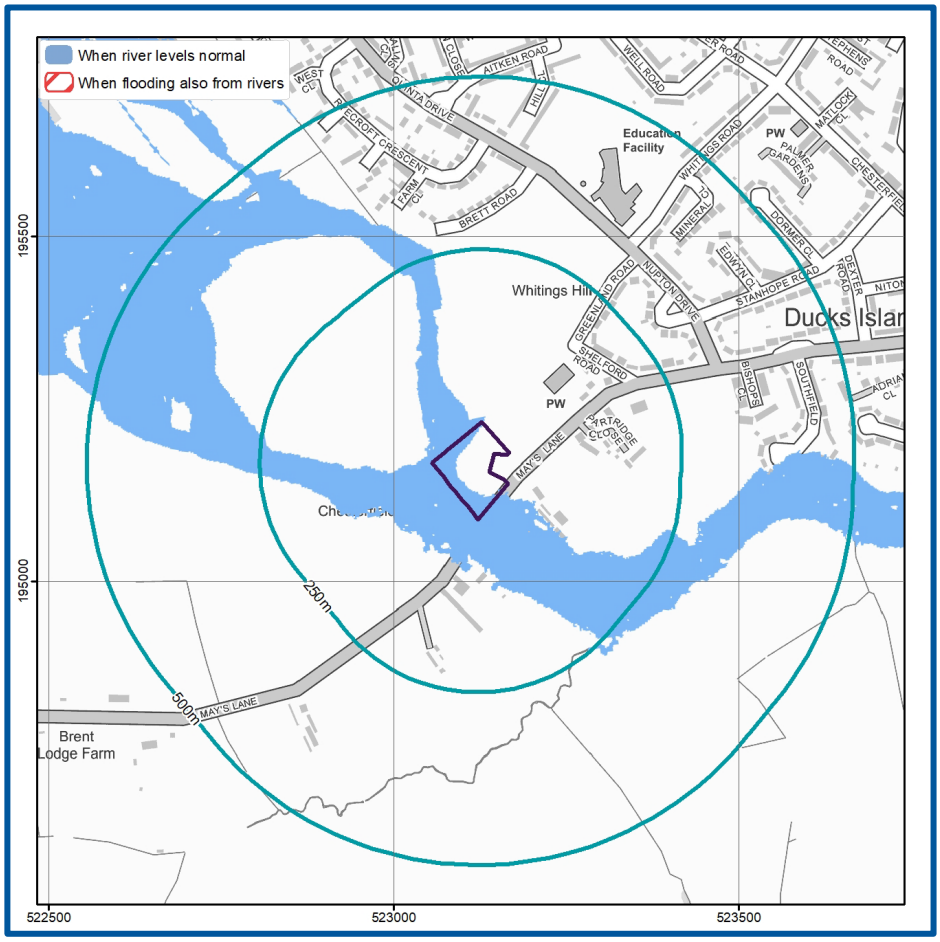
The blockage of watercourses or structures by debris (that is, any material moved by a flowing stream including vegetation, sediment and man-made materials or refuse) reduces flow capacity and raises water levels, potentially increasing the risk of flooding. High water levels can cause saturation, seepage 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 not been identified within 50 m of the Site.

Reservoir flooding

According to the EA's Risk of Flooding from Reservoir mapping the Site is at risk of flooding from reservoirs (Figure 12) (EA, 2024), albeit the planned development area will remain largely flood free. The wider Site is at risk from the Arkley Reservoirs (nos. 3 & 4).

Figure 12. EA Risk of Reservoir Flooding (EA, 2024)



Guidance

The risk of reservoir flooding is related to the failure of a large reservoir (holding over 25,000 m^3 of water) and is based on the worst-case scenario. Reservoir flooding is extremely unlikely to occur (EA, 2024).

5. Flood risk from the development

Floodplain storage

Where flood storage from any source of flooding is to be lost as a result of development, on-site level-for-level compensatory storage, accounting for the predicted impacts of climate change over the lifetime of the development, should be provided. Where it is not possible to provide compensatory storage on site, it may be acceptable to provide it off-site if it is hydraulically and hydrologically linked.

The loss of floodplain storage is less likely to be a concern in areas benefitting from appropriate flood risk management infrastructure or where the source of flood risk is solely tidal.

The development is located within an area which would not be affected by a 1 in 100 year plus climate change event, and hence compensatory storage is not considered to be necessary.

Drainage and run-off

Based on the topography and surface water flood risk in the vicinity, interference or interaction with overland flow paths and inflows from off-Site is considered possible. It is recommended that steps are taken to manage these potential inflows within the Site drainage system.

A Sustainable Drainage Strategy has been prepared separately by GeoSmart (ref: 81841.01R1) to manage the increase in runoff from the Site.

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 the table overleaf (Table 2 of the NPPG (2022)).

As the Site is located within Flood Zone 1, all types of development listed within the Table overleaf are acceptable according to National Policy.

Table 2. Flood risk vulnerability and flood zone 'incompatibility' (taken from NPPG, 2022)

Flood risk vulnerability classification		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood Zone	Zone 1 – low probability	✓	✓	✓	✓	✓

Flood risk vulnerability classification		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
	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

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 sea (coastal/tidal) sources, mitigation measures are not required.

Rivers (fluvial) flood mitigation measures

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

Surface water (pluvial) flood mitigation measures

As the area proposed for development is not identified as being at risk of pluvial flooding, standard mitigation measures are not required.

It would be prudent to move the proposed touring caravan located in the northeast corner of the Site further south / south-east to further reduce the risk of any flooding.

All caravans should remain tethered to the ground (where practical) as a precaution, in the unlikely event of a significant flood in the northeast of the Site.

In addition, the regular maintenance of any drains and culverts surrounding/on the Site under the riparian ownership of the developer should be undertaken to reduce the flood risk.

A surface water drainage (SuDS) strategy has been prepared separately (ref: 81841.01R1) to ensure surface water runoff can be managed effectively over the lifetime of the proposed development.

If the touring caravan was located further to the south / south-east and a suitable SuDS strategy were implemented, the risk of flooding from pluvial sources would reduce from Very Low/Low to Very Low.

Groundwater flood mitigation measures

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

Reservoir flood mitigation measures

There would be a relatively high rate and onset of flooding associated with a reservoir breach, it is therefore unlikely that safe access could be achieved unless a long warning period was provided. Therefore, occupants should evacuate the Site to the east and contact the emergency services.

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: http://www.planningportal.gov.uk/uploads/br/flood_performance.pdf

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.

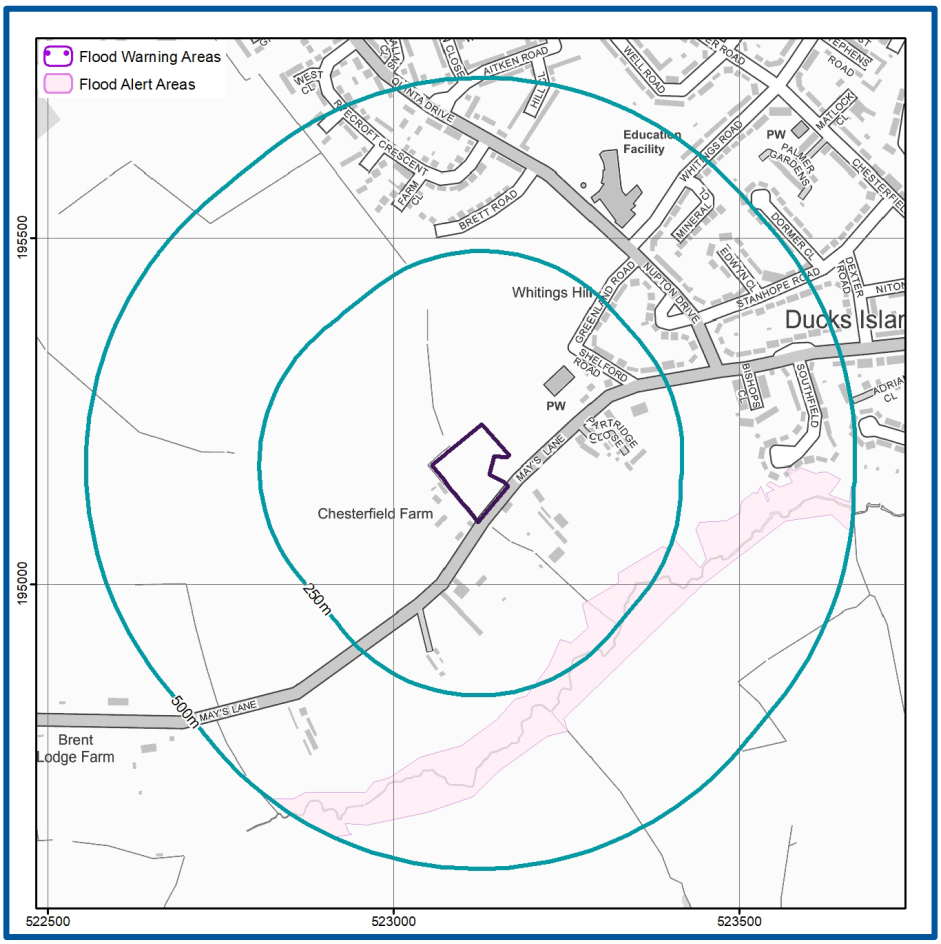
Emergency evacuation from the development and the Site should only be undertaken in strict accordance with any evacuation plans produced for the Site, with an understanding of the flood risks at the Site including available mitigation, the vulnerability of occupants and preferred evacuation routes.

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. 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 13. EA Flood Warning Coverage for the local area (EA, 2024).



Other relevant information

In the absence of any EA Flood Warnings, occupants should be signed up to receive the MET office severe rainfall warnings. Registration can be done via the following link: https://www.metoffice.gov.uk/about-us/guide-to-emails

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 3. Risk ratings following Site analysis

Source of Flood Risk	Baseline[1]	After analysis[2]	After Mitigation[3]
River (fluvial) flooding	Very Low		N/A
Sea (coastal/tidal) flooding	Very Low		N/A
Surface water (pluvial) flooding	Very Low to High	Very Low to Low	Very Low
Groundwater flooding	Negligible		N/A
Other flood risk factors present	Yes (reservoirs)	Yes	Yes
Is any other further work recommended?	Yes	Yes	Yes (see below)

1 BASELINE risks assigned for the whole Site, using national risk maps, including the benefit of EA flood defences.

2 AFTER ANALYSIS modification of risk assessment based on detailed site specific analysis including some or all of the following: flood model data, high resolution mapping, building location, access routes, topographic and CCTV surveys.

3 AFTER MITIGATION risks include risks to proposed development / asset and occupants if mitigation measures recommended in this report are implemented, including the impacts of climate change.

*N/A indicates where mitigation is not required.

Table 4 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.

Highly vulnerable developments in a Flood Zone 1 are acceptable according to the NPPF and providing the recommended mitigation measures are put in place (see previous sections) it is likely that flood risk to this Site will be reduced to an acceptable level.

Table 4. Summary of responses to key questions in the report

Key sources of flood risks identified	Pluvial (surface water) and reservoirs (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 (minor) (see executive summary and Section 7).

9. Further information

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

Additional GeoSmart Products			
✓	Additional assessment: EnviroSmart Report		Provides a robust desk-based assessment of potential contaminated land issues, taking into account the regulatory perspective. 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. Ideal for pre-planning or for addressing planning conditions for small developments. Can also be used for land transactions. Please contact info@geosmartinfo.co.uk for further information.

10. References and glossary

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Ordnance Survey Mapping (2024). © Crown copyright. All rights reserved. Licence number AL 100054687. For full terms and conditions visit: www.ordnancesurveyleisure.co.uk

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GeoSmart Information

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 ±0.25m 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 2024 BlueSky copyright and database rights 2024
Bedrock & Superficial Geology	Contains British Geological Survey materials © NERC 2024 Ordnance Survey data © Crown copyright and database right 2024
Flood Risk (Flood Zone/RoFRS/Historic Flooding/Pluvial/Surface Water Features/Reservoir/ Flood Alert & Warning)	Environment Agency copyright and database rights 2024 Ordnance Survey data © Crown copyright and database right 2024
Flood Risk (Groundwater)	GeoSmart, BGS & OS GW5 (v2.4) Map (GeoSmart, 2024) Contains British Geological Survey materials © NERC 2024 Ordnance Survey data © Crown copyright and database right 2024
Location Plan	Contains Ordnance Survey data © Crown copyright and database right 2024
Topographic Data	OS LiDAR/EA Contains Ordnance Survey data © Crown copyright and database right 2024 Environment Agency copyright and database rights 2024

11. Appendices

GeoSmart Information

Appendix A

Site plans

Site Plan Key/Legend

- Residential gardens
- Grassed area
- Existing buildings/structures
- Existing hardstanding
- Existing hedgerow
- Existing trees
- Existing watercourse
- Existing post & rail timber fence
- Existing close boarded timber fence
- Existing gate
- Red Line Boundary
- Proposed mobile home
- Proposed touring caravan
- Proposed utility/day room
- Proposed loose bound permeable hardstanding
- Proposed tarmacadam surface
- Proposed native hedge & tree planting
- Proposed soakaway
- Proposed package treatment plant
- Proposed foul drainage
- Proposed post & rail timber fence
- Proposed refuse store
- Root protection area (BS 5837:2012)

Issue ID	Issue Name	Current Revision	Initials	Date
P03	Initial Transmittal	P03	EG	15/11/2023
P02	Initial Transmittal	P02	EG	28/09/2023
P01	Initial Transmittal	P01	EG	24/08/2023

Green Planning Studio

Client
Patrick Casey

Project
23_1285 Land NW of Mays Lane - Land Use
Land NW of Mays Lane,
Mays Lane,
Arkley,
Barnet,
EN5 2AH

Drawing Title
Proposed Site Plan

Scale @A1	Date	Drawn
1:500	15/11/2023	EG

Case No	Status
23_1285	Initial Status
Drawing No	**Rev**
003	P03

ISO 19650 No:
23_1285-GPS-ZZ-GF-DR-A-003

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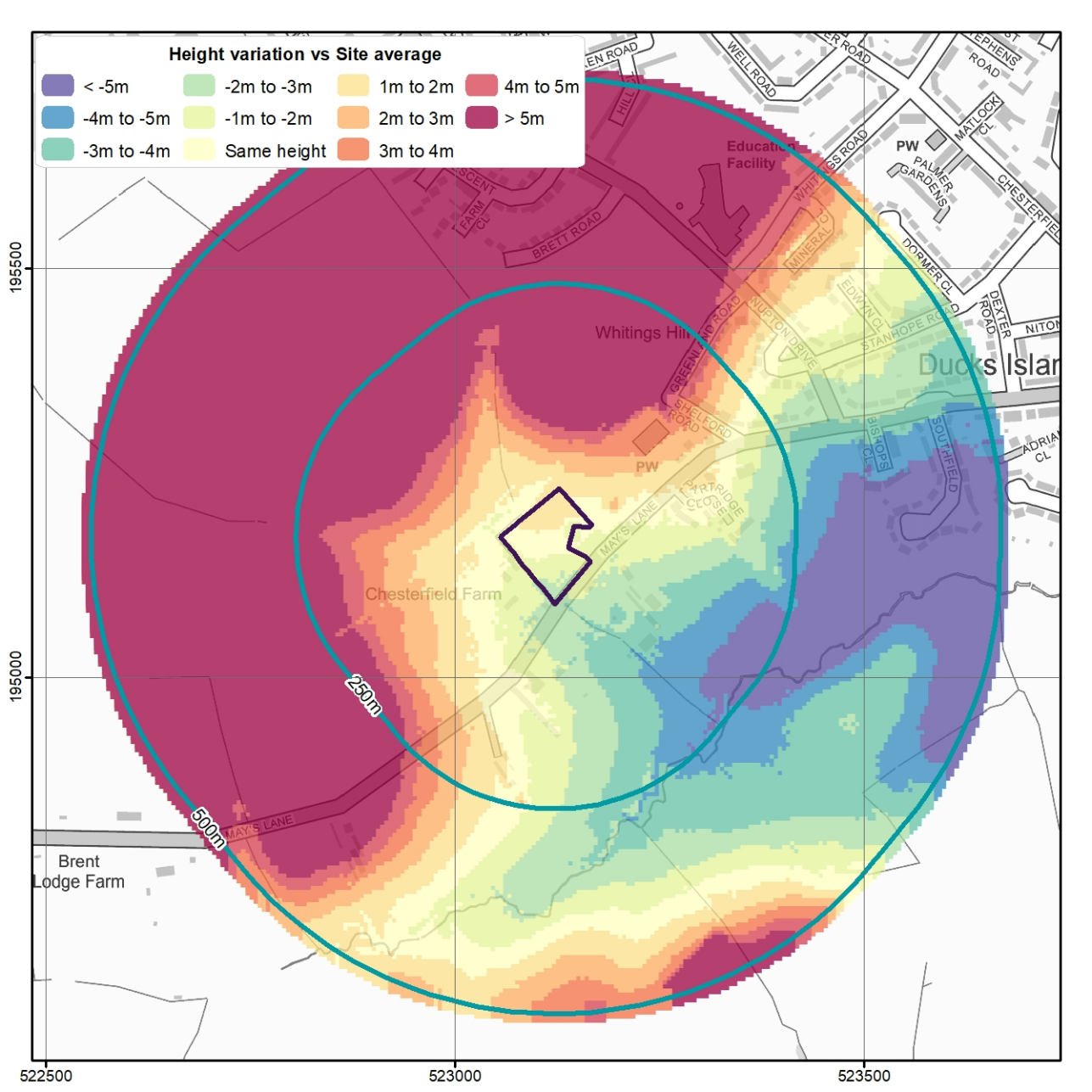
RIBA Chartered Practice

GeoSmart Information

Appendix B

Environment Agency LiDAR ground elevation data


Height variation vs Site average
< -5m
-4m to -5m
-3m to -4m
-2m to -3m
-1m to 2m
Same height
1m to 2m
2m to 3m
3m to 4m
4m to 5m
> 5m
195500
195000
522500
523000
523500
250m
500m
Chesterfield Farm
Brent Lodge Farm
MAY'S LANE
BRETT ROAD
WELL ROAD
PALMER GARDENS
CHESTERFIELD
DORMER CL
DEXTER ROAD
STANHOPE ROAD
SOUTHFIELD
BISHOPS CL
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- 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 up to £5,000 to you if the Ombudsman finds that you have suffered actual financial loss and/or aggravation, distress or inconvenience 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/