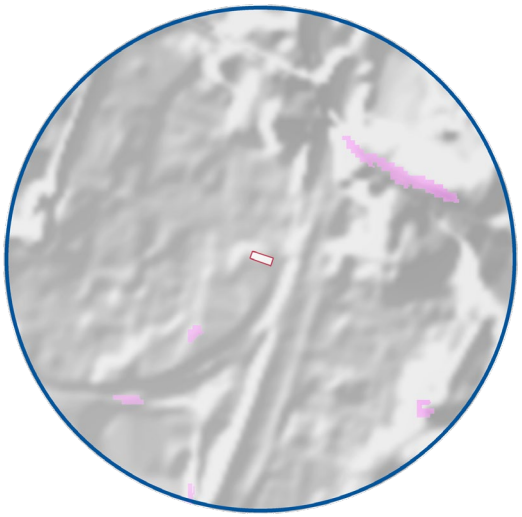
GeoSmart Information

FloodSmart Plus

Flood Consequence Assessment



Site Address

Unit 1A
Wrexham Midpoint
Dolydd Road
LL13 7TF

Grid Reference

332775, 350353

Report Prepared for

C/O Daniel Lintin
JMS Planning and Development Ltd

Date

09/01/2026

Report Status

FINAL

Site Area

225m^2

Report Reference

87685R1

RISK – Very Low to Low

The Site is mapped within NRW's fluvial Flood Zone 2 (Medium probability), with the flood risk originating from the River Gwenfro.

The risk of flooding from rivers and sea is Very Low to Low, taking flood defences into account.

Following analysis of the baseline data the Site is considered to be at a Very Low risk of surface water flooding, a Negligible risk of groundwater flooding and a Low risk of flooding from artificial sources (reservoirs, canals and sewers).

Mitigation measures are recommended in this report to reduce the risks to an acceptable level over the lifetime of the development.

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GeoSmart Information

1. Executive summary

The Planning Policy Wales (PPW) 12th edition (2024) and Technical Advice Note 15 (TAN 15) (2025) requires Flood Consequence Assessments (FCA) to review flooding from all potential sources. A review has been undertaken of national environmental data sets to assess the potential flood risk to the Site. The review is provided within this concise interpretative report

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

1 BASELINE risks assigned for the whole Site, using national risk maps, including the benefit of NRW flood defences and the impacts of climate change.

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. Reasons for the change in classification are provided in the text.

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 used within a commercial capacity as a warehouse unit associated with Wrexham Midpoint centre.

Development proposals comprise the change of use of the existing building to provide a new retail unit (classification A1/A3 – Greggs), with minor alterations. Site plans are included within Appendix A.

Summary of flood risks

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

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

According to NRW's Flood Map for Planning, the Site is located within fluvial Flood Zone 2.

According to the NRW's Flood Risk Assessment Wales (FRAW) map, which considers the type, condition and crest height of flood defences, the Site has a Very Low to Low risk of flooding from the nearby watercourse, the River Gwenfro.

The Site could potentially be at risk from flooding due to blockage or failure of a culvert/bridge located on the watercourse c. 370 m from the Site (Hospital Culvert – blockage 3). Blockage modelling identifies the Site floods during a Low, Medium and High blockage scenario during a 1 in 100 year event with 20% allowance for climate change applied.

Modelled flood data obtained from the NRW has been analysed in line with the most up to date guidance on climate change to confirm a maximum "design" flood level at the Site.

- During a 1 in 100 year plus 20% climate change allowance event the Site remains flood free.

  During an extreme 1 in 1000 year plus 20% climate change allowance event, the flood level would be 87.18mAOD.

  During this event, flood depths in the area proposed for development could be up to 0.22m. Mitigation measures are included within the next section.

Emergency evacuation routes are available to the north.

Surface water (pluvial) flooding

- According to NRW's Flood Map for Planning, the Site is located within Surface Water and Small Watercourses Flood Zone 1.
- According to NRW's Flood Risk Assessment Wales (FRAW) mapping, the Site has a Very Low risk of flooding from surface water and small watercourses.
- Flooding would not affect the area proposed for development in the 1 in 1000-year present day scenario event.

Groundwater flooding

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

The groundwater within the superficial aquifer is likely to be in continuity with the River Gwenfro, which could result in a rise in groundwater levels during high river events.

Following a review of the local topography, BGS borehole data, flood model data and Site plans, the risk of groundwater flooding is considered 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 NRW's Risk of Flooding from Reservoir map confirms the Site is not at risk of reservoir flooding. The potential for a breach of a reservoir to occur and flooding affecting the Site is low.
- Ordnance Survey (OS) data confirms there are no canals near to the Site.
- The Flood Risk Management Plan (NRW, 2016) does not include any information regarding flooding events from sewers at the Site.

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

The risk to the development has been assessed over its expected 75 year lifetime, including appropriate allowances for the impacts of climate change which could increase the flood risk to the Site. Risks identified include increases in river flooding and/or increased potential for surface water flooding, and appropriate mitigation measures are proposed.

Recommendations for flood mitigation are provided below, based upon the flood risk identified at the Site and TAN15 (2025) requirements for commercial Less Vulnerable development:

- Less Vulnerable development must be flood free in the 1 in 100-year fluvial event and 1 in 200 year tidal event, including an allowance for climate change.

  GeoSmart Comment. Analysis of the Site does demonstrate that the development would be flood free during a 1 in 100-year (fluvial) event. The Site is only affected in the event of a culvert blockage at the hospital, according to the modelling (JBA, 2016).

- During an extreme 0.1% flood event including an allowance for climate change, flood depths should not exceed 600 mm at the Site. The maximum permitted velocity of flood waters is 0.15 m/s for Highly Vulnerable development and 0.3 m/s for Less Vulnerable development.

  GeoSmart Comment. Analysis of the Site indicates that flood depths across the Site would be up to 0.22 m during the 1 in 1000 year + CC fluvial event. Flood velocities are well below the permitted 0.3m/s for Less Vulnerable development during this event.

Recommendations

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

- There is a risk of flooding from fluvial sources, where flood depths could be up to 0.22 m in depth in the area proposed for development during a 1 in 1000 year + 20% climate change event. Where raising of FFL's is constrained by the existing building, the FFL should be set as high as possible and standard flood resistance and resilient design measures included (see Section 7).
    - Owners of the Site should also be signed up to receive NRW Flood Alerts and Flood Warnings.
- 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.

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 consequence 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 PPW (2024), and the source(s) of any flood risk present. 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 Technical Advice Note (TAN) 15 (2025) which supplements the PPW (2024).

The general approach of PPW, supported by TAN15, is to advise caution in respect of new development in areas at high risk of flooding by setting out a precautionary framework to guide planning decisions. The overarching aim of the precautionary framework is, in order of preference, to:

- Direct new development away from those areas which are at high risk of flooding; and
- Where development is considered to be in high-risk areas (Zones 2 and 3) only those developments which can be justified on the basis of the tests outlined in Section 6 are located within such areas.

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

A thorough review of a commercially available flood risk report and NRW supplied data has been undertaken, indicating potential sources of flood risk to the Site from rivers and tidal 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 NRW and a review of the North East Wales Place Flood Risk Management Plan (NRW, 2016) is used to ascertain local flooding issues and, where appropriate, identify information to support an assessment of the acceptability criteria for flooding consequences, as required as part of the PPW (2024) and TAN15 (2025).

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*	Natural Resources Wales	OS Data
Historical	X	X	X	
River (fluvial) / Sea (tidal/coastal)	X	X	X	
Surface water (pluvial)	X	X	X	
Groundwater	X	X		

Source of flooding	Datasets consulted			
	Commercial Flood Maps	Local Policy & Guidance Documents*	Natural Resources Wales	OS Data
Sewer		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:

Wrexham Local Plan

Development and Flood Risk Policy EC12

Development (including the raising of land) within defined flood plains will only be permitted if it:

a) would not be subject to an unacceptable risk of flooding on-site; and/or

b) does not result in an unacceptable risk of flooding on or off-site; and/or c) does not adversely affect flood management or maintenance schemes

5.15 Development proposals within areas of flood risk are not only at risk of flooding, but may also exacerbate existing or create new flooding problems on other land or property through reductions in floodplain storage capacity or by impeding flood flows.

Flood alleviation measures can only reduce the risk of flooding and can never eliminate the risk. For these reasons, development within land at an unacceptable risk of flooding will not be permitted. Where detailed information in respect of flood risk is not available, developers will be required to carry out detailed technical investigations to evaluate the extent of the flood risk and ensure that no unacceptable development, including the raising of land, occurs within the flood risk area identified.

Guidance

Strategic Flood Consequence Assessments are carried out by local authorities, in consultation with the Natural Resources Wales, 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 (PPW, 2024).

3. Site analysis

Site information

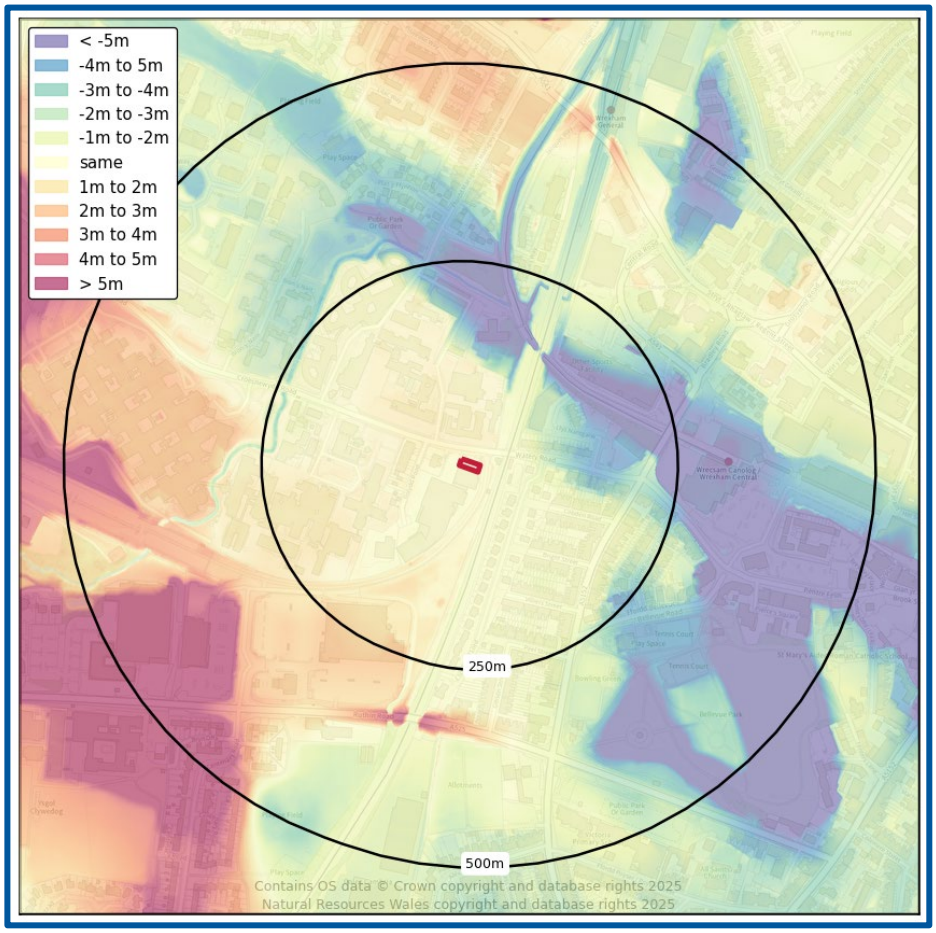
The Site is located in Wrexham in a setting of commercial and residential land use at National Grid Reference SJ 32775 50353.

Figure 1. Aerial imagery of the Site (Bluesky, 2026)



Figure 2 indicates ground levels within 500m of the Site fall in a north easterly direction associated with the nearby railway line and indicates that the general ground levels on the Site are between 86.96 and 87.17 mAOD with the Site generally level. This is based on NRW elevation data obtained for the Site to a 1 m resolution with a vertical accuracy of ±0.15 m.

Figure 2. Site Location and Relative Elevations (GeoSmart, 2026)



Development

The Site is currently used within a commercial capacity as a warehouse unit associated with Wrexham Midpoint centre.

Development proposals comprise the change of use of the existing building to provide a new retail unit (classification A1/A3 – Greggs), with minor alterations. Site plans are included within Appendix A.

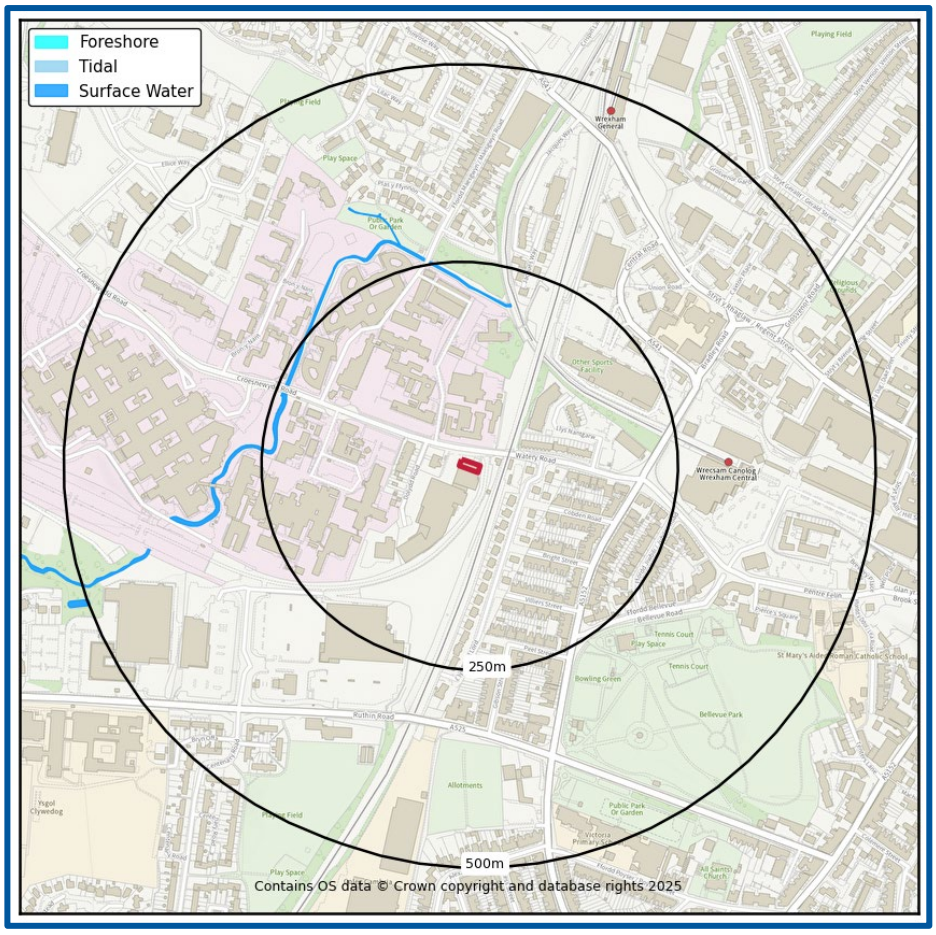
The effect of the overall development will result in an increase in number of occupants and/or users of the building and will result in the change of use, nature or times of occupation. According to Figure 4 of TAN 15 (2025), the vulnerability classification of the existing development is Less Vulnerable and proposed development is Less Vulnerable. The estimated lifespan of the development is 75 years.

Hydrological features

According to Ordnance Survey (OS) mapping included in Figure 3, a single surface water feature is located within 500 m of the Site.

- The River Gwenfro is located c. 250m to the west of the Site, flowing in a northeasterly direction.

Figure 3. Surface water features (EA, 2026)



Proximity to relevant infrastructure

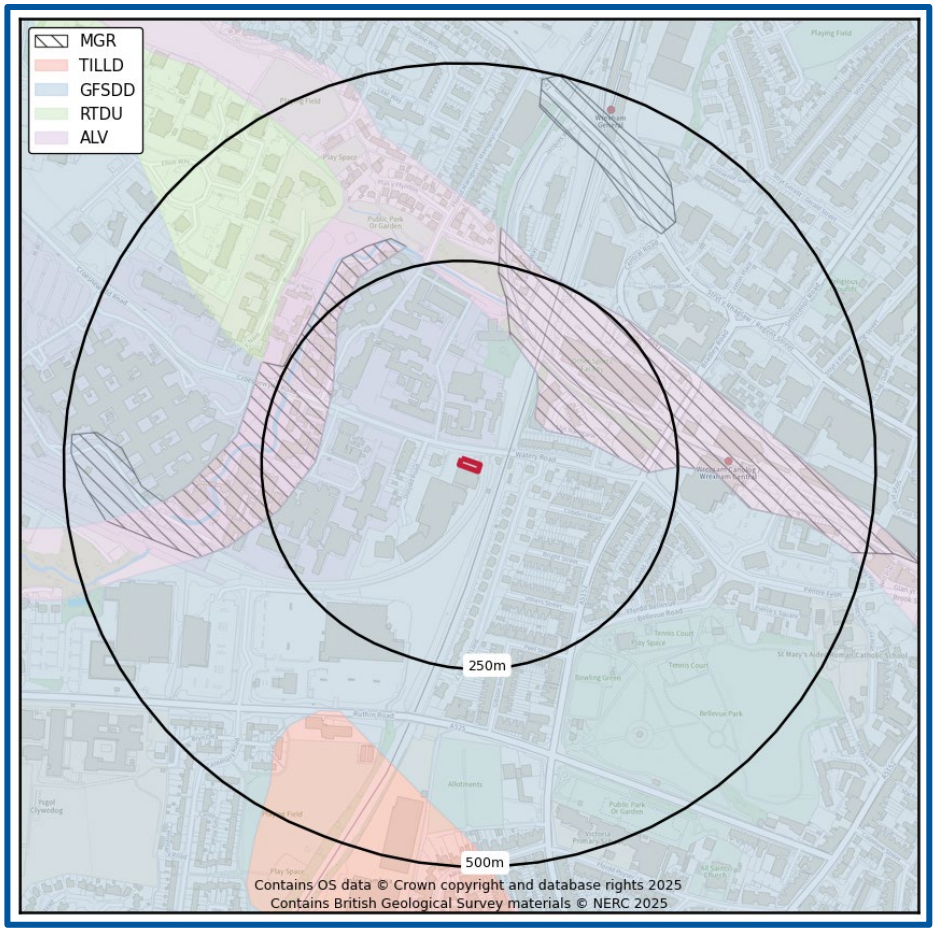
Infrastructure has been identified within proximity of the Site which could influence the risks of flooding to existing or future occupants. These include:

- A railway line is located c. 30 m to the east of the Site boundary.
- The River Gwenfro appears to be culverted in numerous locations, the closest c. 200m north of the Site.
- There is a bridge over the River Gwenfro, located c. 230m to the west of the Site.

Hydrogeological features

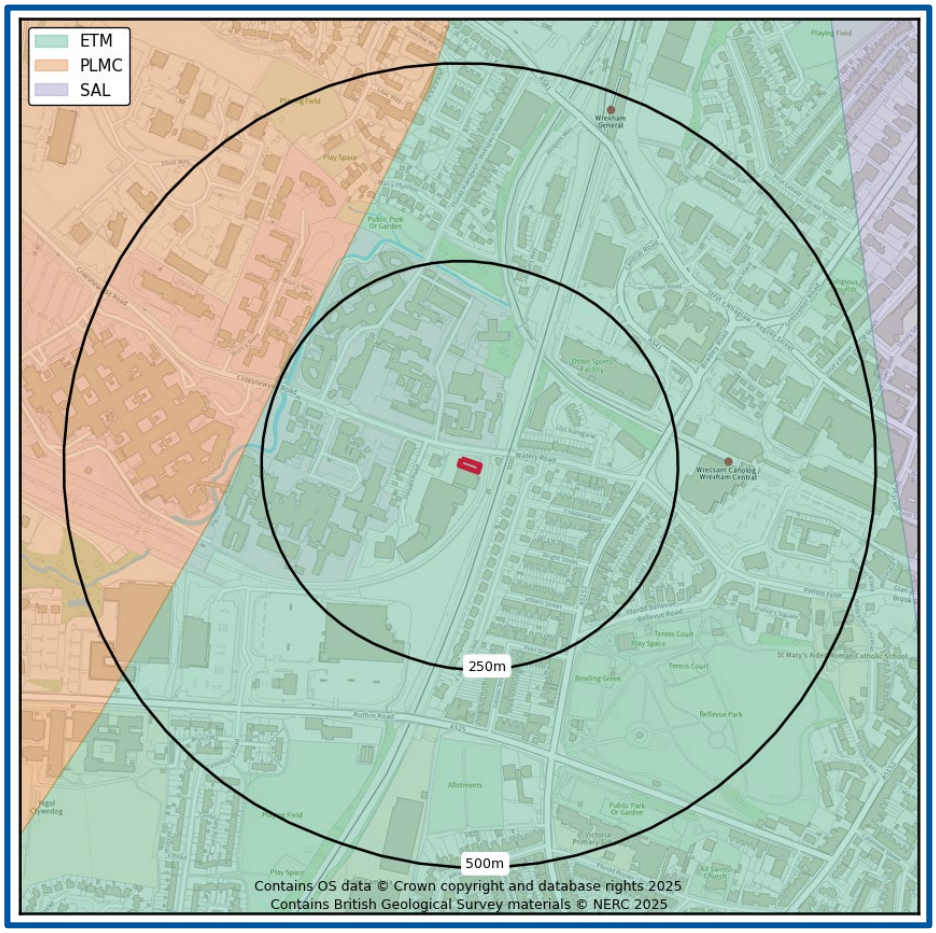
British Geological Survey (BGS) mapping indicates the underlying superficial geology (Figure 4) consists of Glaciofluvial Sheet Deposits (GFSDD), which comprises sand and gravel (BGS, 2026). These deposits are classified by BGS as a Secondary (A) Aquifer, which indicates it is likely to comprise permeable layers capable of supporting water supply at a local rather than strategic scale.

Figure 4. Superficial Geology and Artificial Deposits (BGS, 2026)



BGS mapping indicates the underlying bedrock geology (Figure 5) consists of the Etruria Formation (ETM), which comprises mudstone (BGS, 2026). This bedrock geology is classified by BGS as a Secondary (A) Aquifer, which indicates it is likely to comprise permeable layers capable of supporting water supply at a local rather than strategic scale.

Figure 5. Bedrock Geology (BGS, 2026)



Geological conditions

A review of the BGS borehole database (BGS, 2026) indicates the nearest and most relevant borehole to the Site (ref: SJ35SW944) is located c. 115 m to the northeast of the Site boundary at an elevation of 84.10 mAOD (estimated using LiDAR). A summary of the geological strata encountered by the borehole is provided within the table overleaf.

Table 2. Summary of BGS borehole information

Strata encountered	BGS borehole SJ35SW944	
	Depth to base of stratum (m bgl)	Strata composition
Made Ground	0.90	Black sandy gravel with ash
Glaciofluvial Sheet Deposits	2.00	Brown clay becoming sandy with depth
	>2.40 (base of trial pit record)	Brown clayey sandy fine to coarse gravel

Groundwater

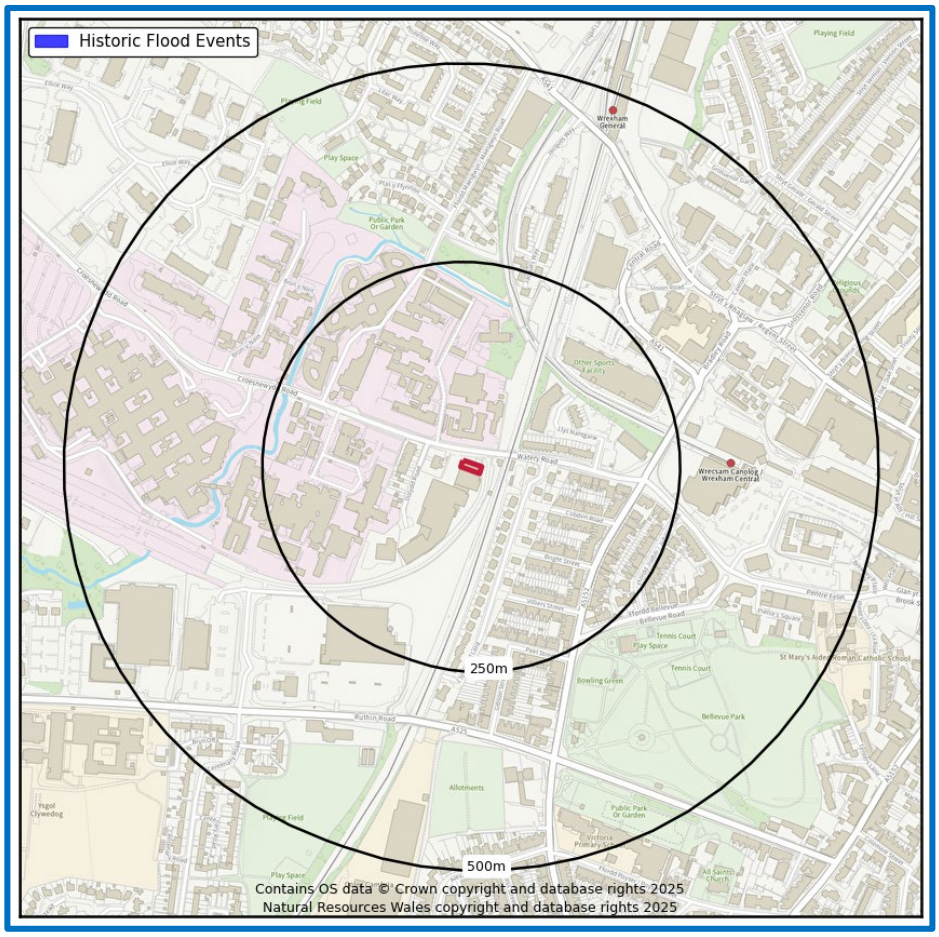
Borehole ref: BGS borehole SJ35SW944 did not encounter groundwater to its maximum depth of 2.40 m bgl in April (year unknown) subject to seasonal variations.

4. Flood risk to the development

Historical flood events

According to the NRW's Recorded Flood Extents Map (Figure 6) and the North East Place Flood Risk Management Strategy (NRW, 2016), no flooding events have historically affected the Site.

Figure 6. Historic Flood Event Outline (NRW, 2026)



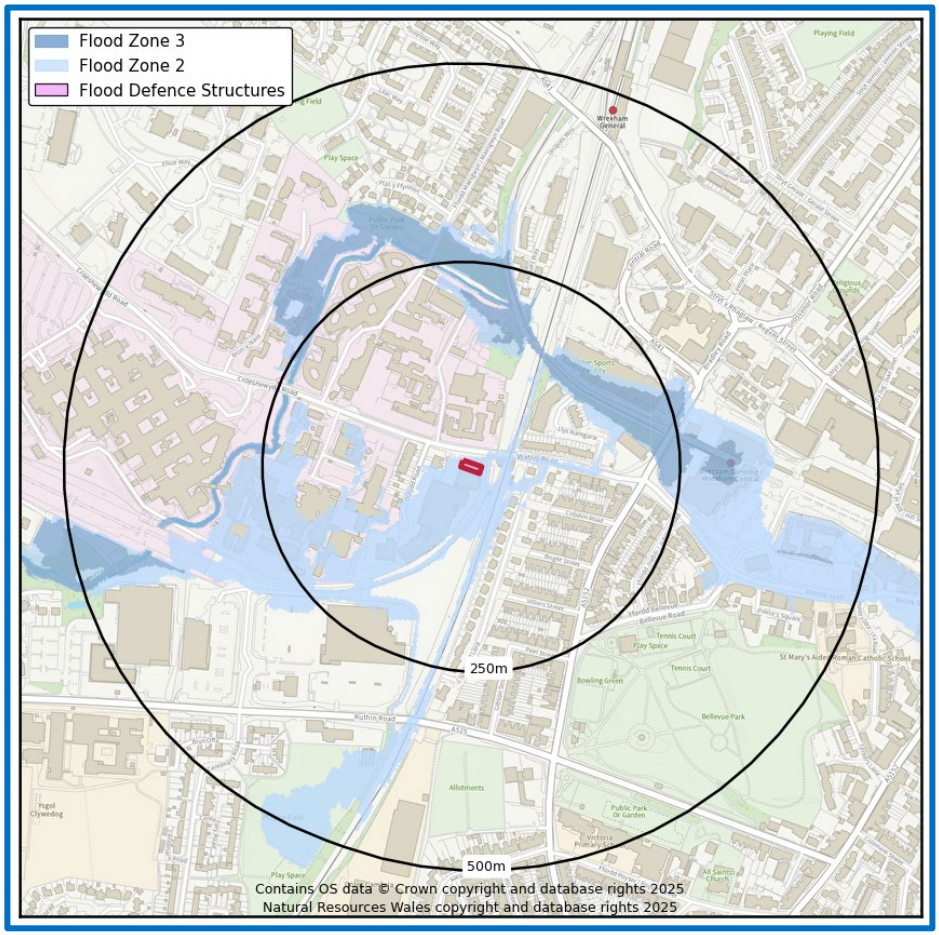
The purpose of historical flood data is to provide information on where and why flooding may have occurred in the past. The absence of any recorded events does not mean flooding has never occurred on-Site or that flooding will never occur at the Site.

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

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

According to the NRW's Flood Map for Planning (Figure 7), the Site is located within fluvial Flood Zone 2 and is therefore classified as having a Medium probability of fluvial flooding from the River Gwenfro.

Figure 7. NRW Flood Zone mapping (NRW, 2026)



Flood defences

Guidance

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 FCA subject to local topography.

Existing flood defences

There are no formal flood defences within 500 m of the Site.

From the available information, the likelihood of future flood schemes for the Wrexham area could not be ascertained at the time of writing; it is therefore assumed that the risk presented by the River Gwenfro Modelling Study (JBA, 2016) is likely to be sufficiently representative of the future fluvial flood risk at the Site.

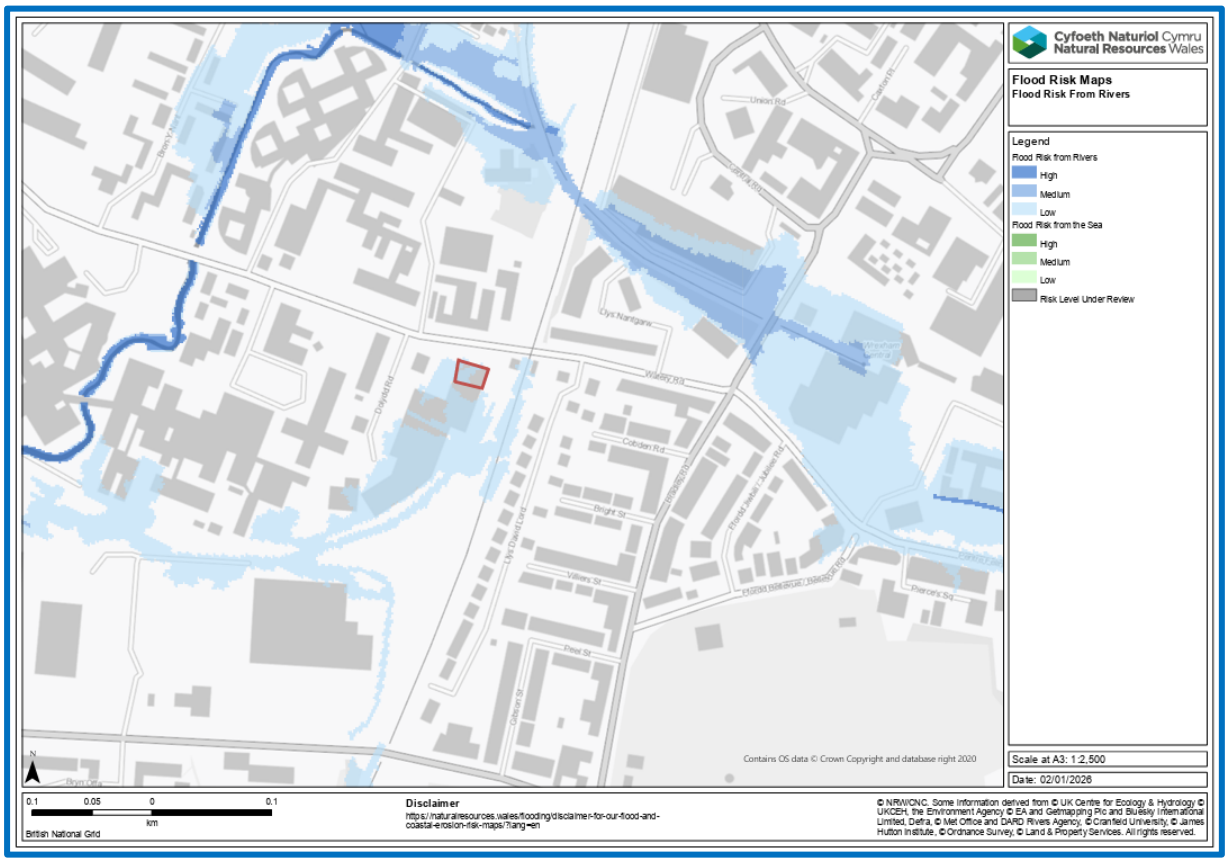
Flood risk including the benefit of defences

The Flood Risk Assessment Wales (FRAW) maps were published in the Summer of 2020.

The FRAW mapping includes consideration of flood defences that have been built to protect against flooding from rivers and the sea. The defences shown provide different levels of flood protection and this is recognised in the risk classification shown in the Flood Risk Assessment Wales (FRAW) map, which indicate:

- The risk from Rivers is Very Low to Low (Figure 8).
- The risk from the Sea is Very Low.

Figure 8. Rivers – FRAW Risk Map (NRW, 2026)



Model data (Fluvial)

As the Site is located within the NRW's fluvial floodplain, modelled flood elevation data was obtained from NRW and has been used to assess flood risk and to provide recommendations for mitigation for the proposed development.

Defended modelled data from the River Gwenfro Modelling Study (JBA Consulting, 2016) has been extracted from the 2D floodplain data provided at the Site.[1]. The data is provided in the table below and is included within Appendix B.

Table 3. NRW present day modelled flood data

Flood data	Flooding scenario			
	1 in 30 year	1 in 75 year	1 in 100 year	1 in 1000 year
Flood level (mAOD)	N/A			86.97
Flood depths (m)*	Not in flood extent – see Figure 9			Up to 0.01

*Compared to ground levels at the Site between 86.96 and 87.17 mAOD.

The figure overleaf confirms the flood extent associated with overtopping of the flood defences in the present-day flooding scenarios.

[1] The accuracy of the modelled flood levels are not known. These are dependent on the accuracy of input datasets such as LiDAR data, used to model the impacts of flooding within the 2D domain. Confirmation of the accuracy of the modelled flood data can be obtained separately from the Environment Agency.

Figure 9. Modelled present day flooding scenarios (JBA, 2016)



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Climate change factors

In accordance with the Welsh Government's *Climate Flood Consequences Assessments: Climate change allowances guidance (2021)*, allowances should be made for the impact of increased river and sea levels and flows to the proposed development.

As the Site is located within the Dee River Basin and the proposed development is classed as Less Vulnerable, where the proposed lifespan is 75 years, the Central (20%) allowances have been used to determine a suitable climate change factor to apply to river data.

The River Gwenfro Modelling Study (JBA, 2016) includes a modelled scenario for the 1 in 100 year and 1 in 1000-year events including a 20% allowance for climate change, which have been used to identify a suitable increase in river flows from the River Gwenfro.

Table 4. Flood levels plus climate change allowances

Flood data	Flooding scenario	
	1 in 100 year plus 20% 2080s allowance for climate change	1 in 1000 year plus 20% allowance for climate change
Modelled flood level (mAOD)	N/A	87.18
Flood depths (m)*	Not in flood extent	Up to 0.22

*Compared to ground levels at the Site between 86.96 and 87.17 mAOD.

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 tidal floodplains.

According to NRW's Flood Map for Planning, the Site is located within Surface Water and Small Watercourses Flood Zone 1.

According to the NRW's Flood Risk Assessment Wales (FRAW) mapping (Figure 10), the Site has a Very Low risk of pluvial flooding.

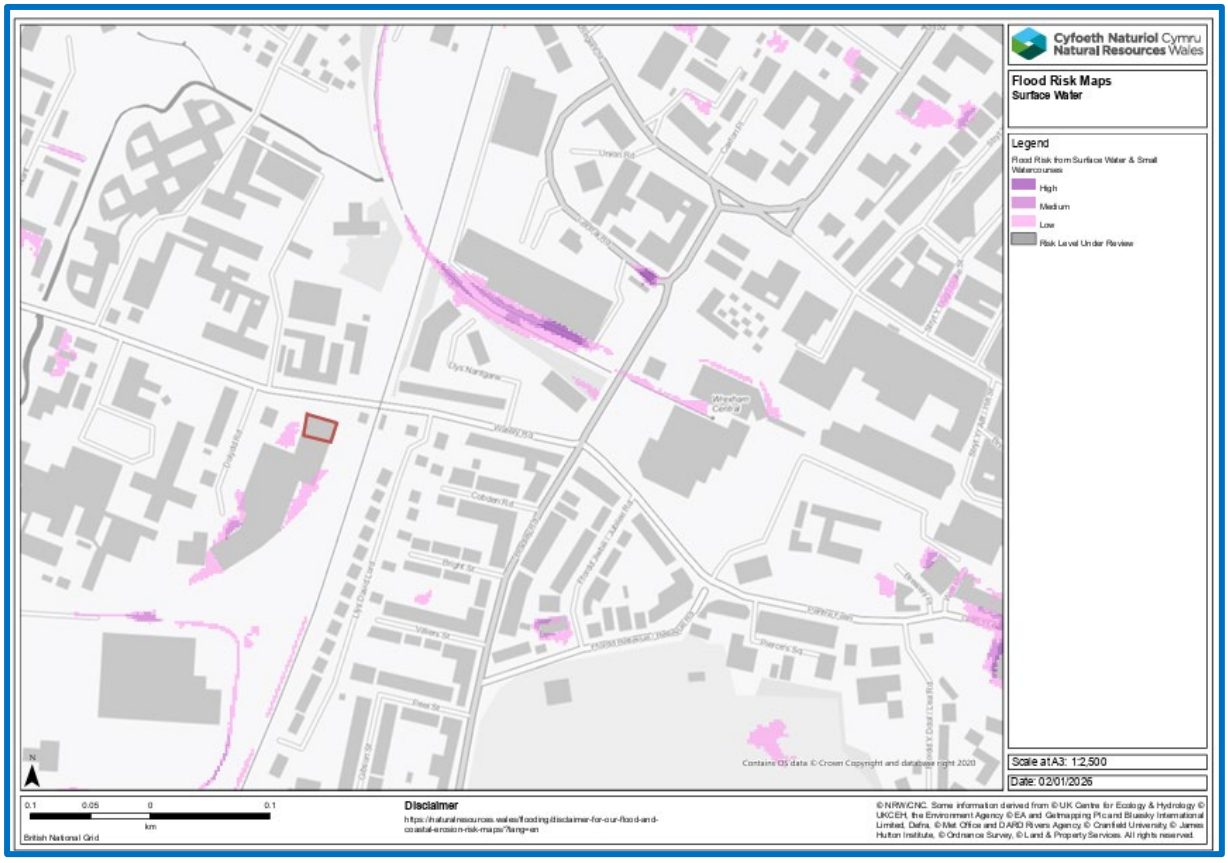
- The Site remains flood free throughout all modelled scenarios including an extreme 1 in 1000-year event. Some isolated flooding is noted to the west of the Site during an extreme event but will not impede access or egress from the Site, as flood depths are less than 0.30m during this event.

Guidance

According to NRWA'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 10. Surface Water and Small Watercourses – FRAW risk map (NRW, 2026)



Surface water flooding flow routes

Analysis of OS mapping, ground elevation data and the NRW's surface water flood risk mapping confirms the Site is not located on a potential overland flow route.

Climate change factors

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 (NRW, 2026).

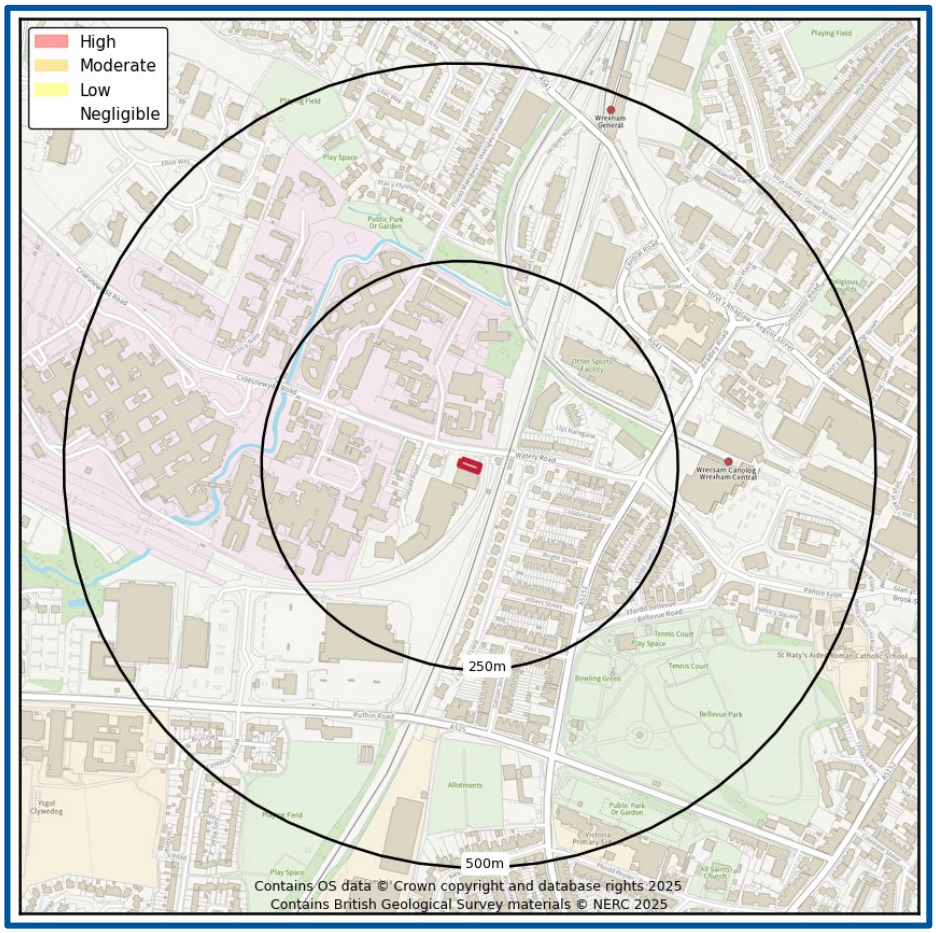
To consider the risk of surface water flooding over the lifetime of the development, the 0.1% AP (1 in 1000 year) surface water flooding event has been used as a proxy in this instance for the 1% AP (1 in 100 year) plus climate change event. This indicates that the Site would remain flood free during a future climate change event.

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 the surface in the vicinity from permeable bedrock and superficial aquifers during a 1 in 100-year event.

Figure 11. GeoSmart GW5 Groundwater Flood Risk Map (GeoSmart, 2026)



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, site investigation and the NRW's fluvial floodplain data 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. *Note: The risks are higher for basements, buried infrastructure and soakaway systems which may be affected by high groundwater levels.*

According to a review of the hydrogeology (Section 3), the Site is underlain by permeable superficial deposits above permeable bedrock. Groundwater levels may rise in the bedrock and superficial aquifers in a seasonal response to prolonged rainfall recharge which may cause an unusually high peak in groundwater levels during some years.

Groundwater levels may also rise in the bedrock aquifer in response to high river events due to the potential hydraulic continuity with the River Gwenfro. However, the Site is located at a significant distance from the watercourse.

Despite the presence of an aquifer, the Site would only be at risk of groundwater flooding if the water table reaches the base of the Site development or the ground surface, when groundwater seepage could lead to overland flow and ponding. The surrounding topography suggests that groundwater seepage is more likely to occur downgradient of the Site to the north. The presence of hardstanding across the entire Site will also limit the ingress of water at the surface.

Borehole ref: BGS borehole SJ35SW944 did not encounter groundwater to its maximum depth of 2.40 m bgl in April (year unknown) subject to seasonal variations.

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 further analysis confirms that this would be appropriate for the Site.

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.

The impact of climate change on groundwater levels beneath the Site is linked to the predicted rise in peak river levels, as well as 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 Flood Risk Management Plan (NRW, 2016) does not include any information regarding flooding events from sewers at the Site.

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

Canals typically present a residual risk to Site rather than a direct flood risk due to the water levels being highly managed within an operating zone. Flooding can still occur from canals as a result of overtopping due to prolonged rainfall or embankment failure.

According to Ordnance Survey (OS) mapping, there are no canals within 500 m of the Site and therefore the risk is considered to be Negligible.

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 (Welsh 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.

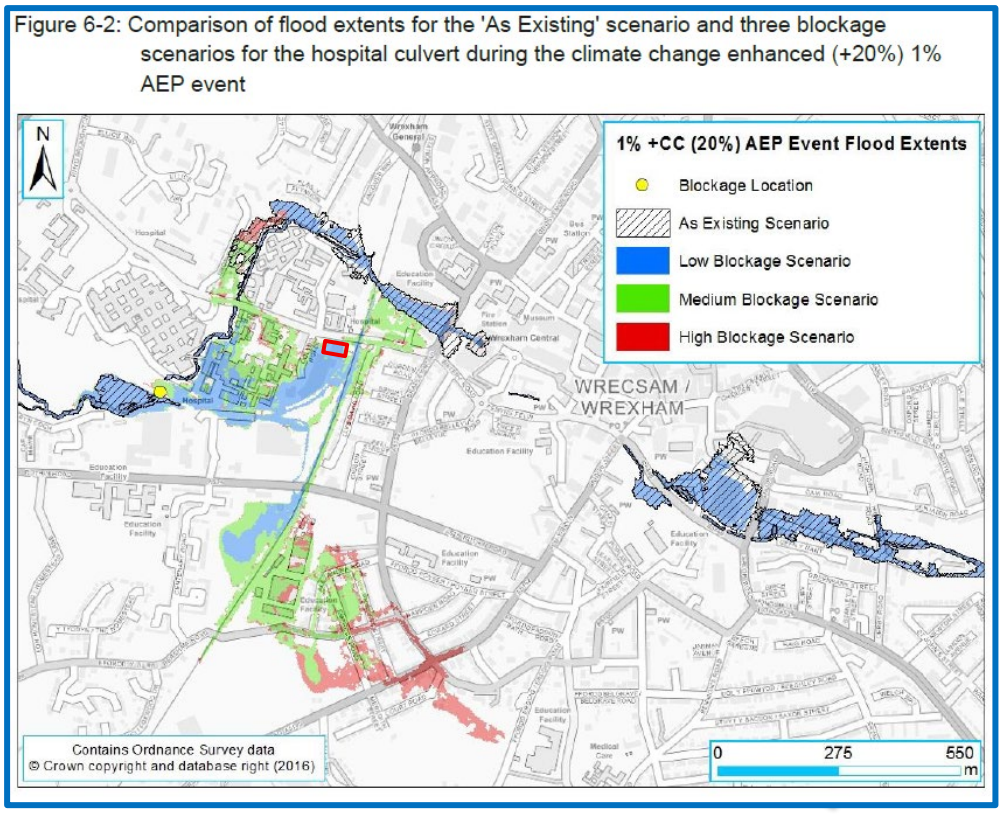
The most relevant blockage (hospital – BLCK3) has been provided below, which confirms the Site would flood during a High (100%), Medium (67%) and Low risk scenario (33%) during a 1 in 100-year event with 20% allowance for climate change applied.

Table 5. NRW blockage modelling data

Flood data	1 in 100 year + 20% climate change allowance		
	Low (33% blockage)	Medium (67% blockage)	High (100% blockage)
Flood level (mAOD)	87.09	87.27	87.30
Flood depths (m)*	Up to 0.13	Up to 0.31	Up to 0.34

*Compared to ground levels at the Site between 86.96 and 87.17 mAOD.

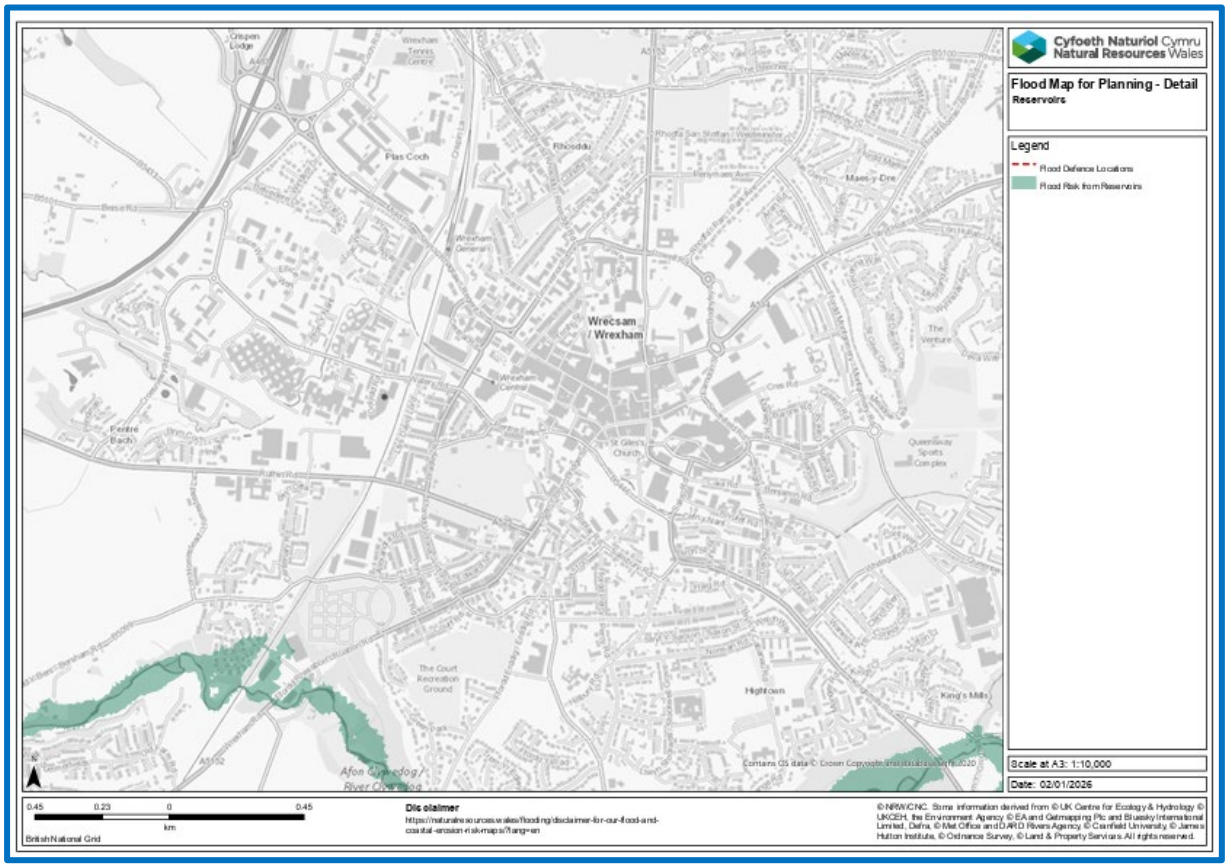
Figure 12. Flood mapping of a 33%, 67% and 100% blockage at the Hospital Culvert (JBA, 2016)



Reservoir flooding

According to the NRW's Flood Risk from Reservoirs mapping the Site is not at risk of flooding from reservoirs (Figure 13) (NRW, 2026).

Figure 13. NRW Flood Risk from Reservoirs Flooding (NRW, 2026)



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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 (NRW, 2026).

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 fluvial Flood Zone 2 and does not involve an increase in building footprint and would not be impacted by the 1 in 100 year plus 20% climate change event. Therefore, there would be no displacement of flood water and compensatory flood storage is not required.

Drainage and run-off

Based on the topography and Very Low surface water flood risk in the vicinity, interference or interaction with overland flow paths and inflows from offsite is considered unlikely.

The development proposals are for a change of use and will not involve the alteration of any external features (or any changes to existing impermeable and permeable areas), an estimation of surface water runoff is not considered to be required.

Any changes to the existing drainage system will be undertaken in accordance with best practice and care will be taken to ensure the new development does not overload/block any existing drainage or flow pathways to/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 TAN15 (2025) and PPW (2024) are achieved by confirming that the proposed development meets the acceptability criteria for flooding consequences.

Guidance
Acceptability criteria for flooding consequences: All developments should be designed to be flood free during the 1% river flood and 0.5% flood from the sea, plus an allowance for climate change over the lifetime of development.
Tolerable conditions: During an extreme 0.1% flood event, flood depths should not exceed 600 mm at the Site. The maximum permitted velocity of flood waters is 0.15 m/s for Highly Vulnerable development and 0.3 m/s for Less Vulnerable development.

As the Site is located within Flood Zone 2 and the proposed development is defined as Less Vulnerable, the proposals must satisfy the acceptability criteria.

Table 6. Flood risk vulnerability and flood zone compatibility (taken from TAN15, 2025)

Flood risk vulnerability classification	Highly vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓
Defended Zone	Must satisfy acceptability criteria and tolerable conditions	✓	✓
Zone 2	Must satisfy acceptability criteria and tolerable conditions	Must satisfy acceptability criteria	✓
Zone 3	X (greenfield land) / brownfield land must satisfy acceptability criteria and tolerable conditions	Must satisfy acceptability criteria	✓

Acceptability criteria for flooding consequences:

Less Vulnerable development must be flood free in the 1 in 100 year fluvial event and 1 in 200-year tidal event, including an allowance for climate change.

- GeoSmart Comment. Analysis of the Site demonstrates that the development would be flood free during a 1 in 100-year (fluvial) event. The Site is only affected during an extreme 1 in 1000-year event, where flood depths are extremely minor.

Tolerable conditions:

During an extreme 0.1% flood event including an allowance for climate change, flood depths should not exceed 600 mm at the Site. The maximum permitted velocity of flood waters is 0.15 m/s for Highly Vulnerable development and 0.3 m/s for Less Vulnerable development.

- GeoSmart Comment. Analysis of the Site indicates that flood depths across the Site would be up to 0.3 m during the 1 in 1000 year + CC fluvial event and flood velocities are low (0.02m/s). Therefore, the tolerable conditions are met by the proposed development.

Natural Resources Wales Flood Risk Standing Advice for Sites located in Flood Zones 2 or 3[2]

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 consequence 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 5 square metres.

Access and evacuation

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

[2] Please note in the absence of NRW FRSA the EA guidance (2022) has been used in lieu providing a clear framework for Flood Risk assessment and mitigation strategies and deemed sufficiently applicable

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; and
- 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:

- 300 millimetres (mm) above the general ground level of the site; OR
- At least 600 mm above the estimated river or sea flood level.

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 located within an area which is affected by flooding from rivers. The following table confirms the flood depths associated with the area proposed for development

Table 7. Flood levels compared to ground levels in the area proposed for development

Flood data	Flooding scenario	
	1 in 1000 year	1 in 1000 year plus 20% CC
Flood level (mAOD)	86.97	87.18
Flood depths (m)*	Up to 0.01	Up to 0.22

*Compared to ground levels at the Site between 86.96 and 87.17 mAOD.

Alternative Mitigation

As the proposed development is for a change of use it may not be feasible to raise minimum finished floor levels to the recommended elevation. If so, finished floor levels should be raised as high as feasible and adopt a water exclusion strategy for flood depths up to 0.3 m in line with the NRW's Standing Advice. A water exclusion strategy, using avoidance and resistance measures, is appropriate where floods are expected to last for short durations. Potential water exclusion strategies include:

- Passive flood door systems;
- Temporary flood barriers;
- Air brick covers (manual or automatic closing);
- Non-return flap valves on sewer outfalls.

Avoidance and resistance measures are unlikely to completely prevent floodwater entering a property, particularly during longer duration flood events. Therefore, it is recommended that the following flood resilience measures are also considered.

- Flood resilient materials and designs:
    - Use of low permeability building materials up to 0.3 m such as engineering bricks (Classes A and B) or facing bricks;
    - Hard flooring and flood resilient metal staircases;
    - The use of internal lime plaster/render or where plasterboards are used these should be fitted horizontally instead of vertically and/or using moisture resistant plasterboard at lower levels;
    - Water, electricity and gas meters and electrical sockets should be located above the predicted flood level;
    - Communications wiring: wiring for telephone, TV, Internet and other services should be protected by suitable insulation in the distribution ducts to prevent damage.

If these mitigation measures are implemented this could reduce the flood risk to the development from Very Low / 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

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

Reservoir flood mitigation measures

The Site is not at 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 are not 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

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, Highly 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.

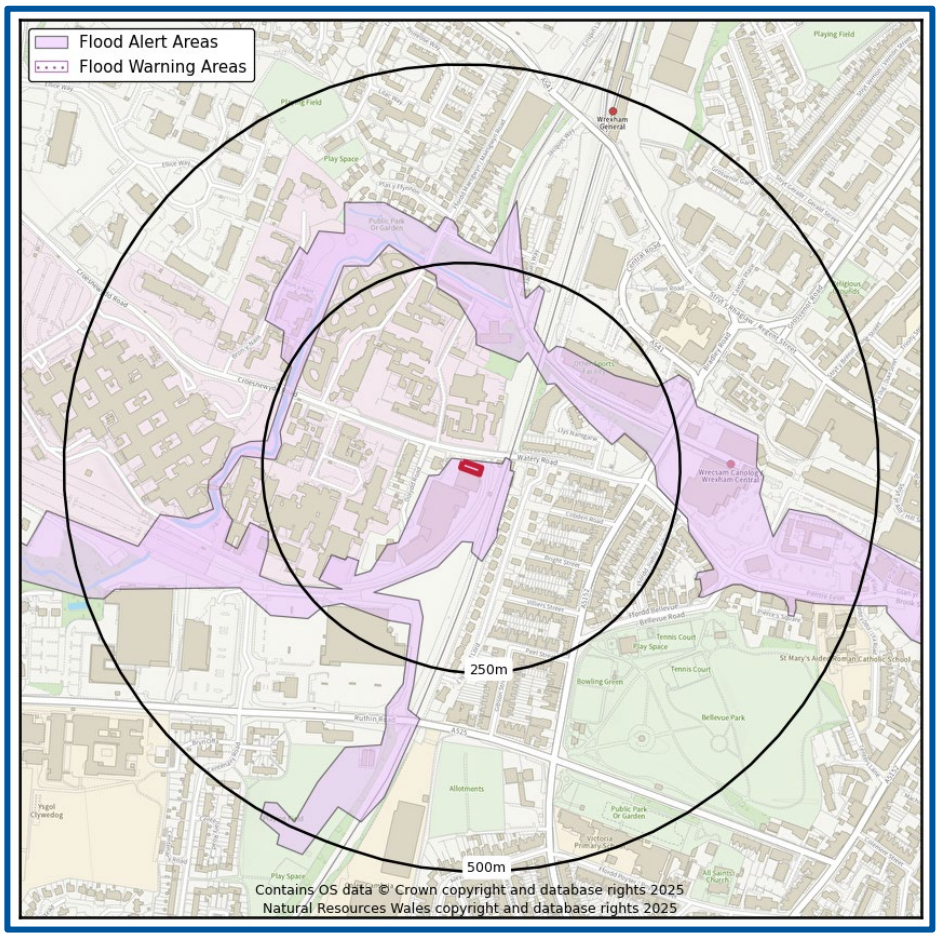
Flood warnings

The NRW 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 NRW Flood Alerts coverage area so is able to receive alerts (Figure 14). All warnings are also available through the NRW's 24 hour Floodline Service (0345 988 1188).

- Flood Alert: Lower Dee Catchment; Quick Dial code: 501019

The NRW 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 14. NRW Flood Warning Coverage for the local area (NRW, 2026)



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 along Croesnewydd Road (c. 20 m north – direct measurement). 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 NRW Flood Warning is issued in order to completely avoid flood waters.

On-Site refuge

Due to the current configuration of the development, on-Site refuge is not available. As such, evacuation of the Site should be considered on the immediate receipt of a flood alert.

Other relevant information

A Business Continuity Plan (BCP) is recommended to reduce risks to people, property and profit.

A Flood Warning and Evacuation Plan (FWEP) is recommended, and Site owners should be signed up to receive NRW Flood Alerts.

Registration to the Natural Resource Wales 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 8. Risk ratings following Site analysis

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

1 BASELINE risks assigned for the whole Site, using national risk maps, including the benefit of NRW flood defences and the impacts of climate change.

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. Reasons for the change in classification are provided in the text.

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.

The table below provides a summary of where the responses to key questions are discussed in this report.

Less Vulnerable developments in Flood Zone 2 are acceptable according to TAN15 (2025) 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 9. Summary of responses to key questions in the report

Key sources of flood risks identified	Fluvial (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 (See exec summary and Section 7)

9. References and glossary

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Glossary

General terms

BGS	British Geological Survey
NRW	National Resource Wales
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.
SFCA	Strategic Flood Consequence 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.

Data Sources

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Bedrock & Superficial Geology	Contains British Geological Survey materials © NERC 2026 Ordnance Survey data © Crown copyright and database right 2026
Flood Risk (Flood Zone/Fluvial/Tidal/Historic Flooding/Pluvial/Surface Water	Natural Resource Wales copyright and database rights 2026

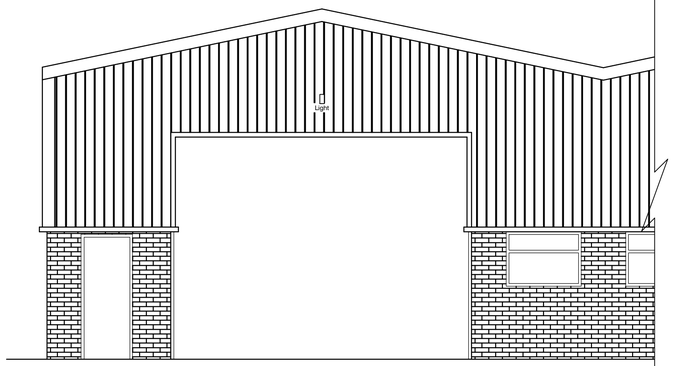
Features/Reservoir/Flood Alerts & Warnings)	Ordnance Survey data © Crown copyright and database right 2026
Flood Risk (Groundwater)	GeoSmart, BGS & OS GW5 (v2.4) Map (GeoSmart, 2026) Contains British Geological Survey materials © NERC 2026 Ordnance Survey data © Crown copyright and database right 2026
Location Plan	Contains Ordnance Survey data © Crown copyright and database right 2026
Topographic Data	OS LiDAR/EA Contains Ordnance Survey data © Crown copyright and database right 2026 Natural Resource Wales copyright and database rights 2026

10. Appendices

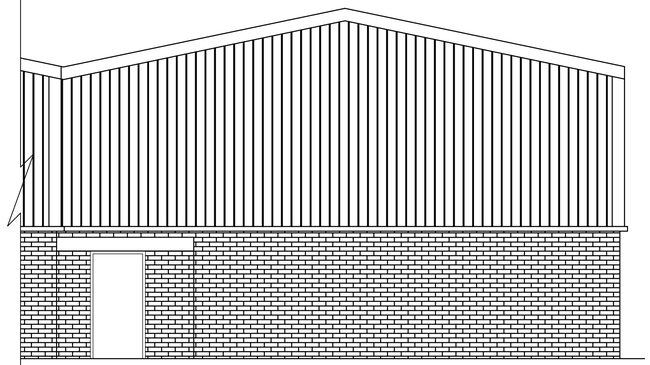
GeoSmart Information

Appendix A

Site plans



EXISTING FRONT ELEVATION (1:50)



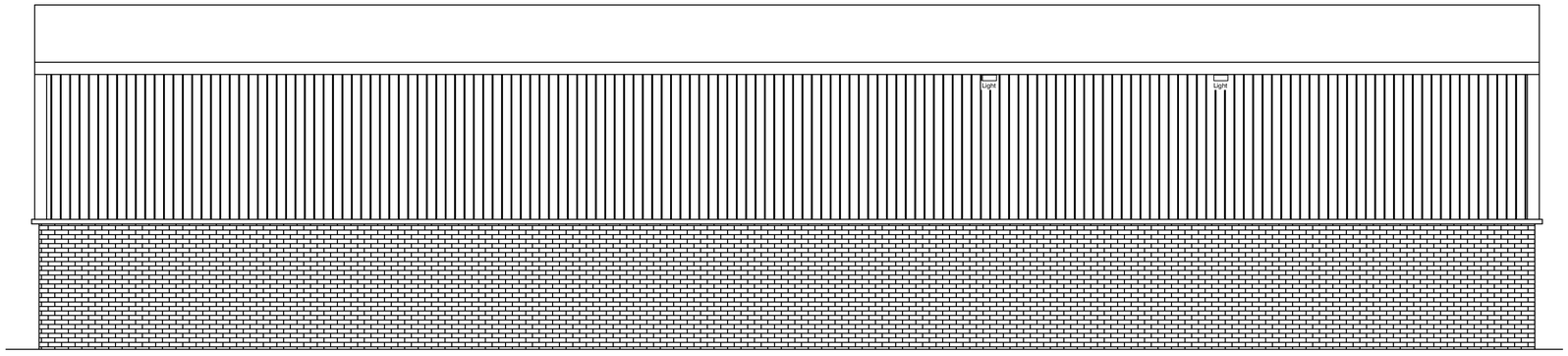
EXISTING REAR ELEVATION (1:50)



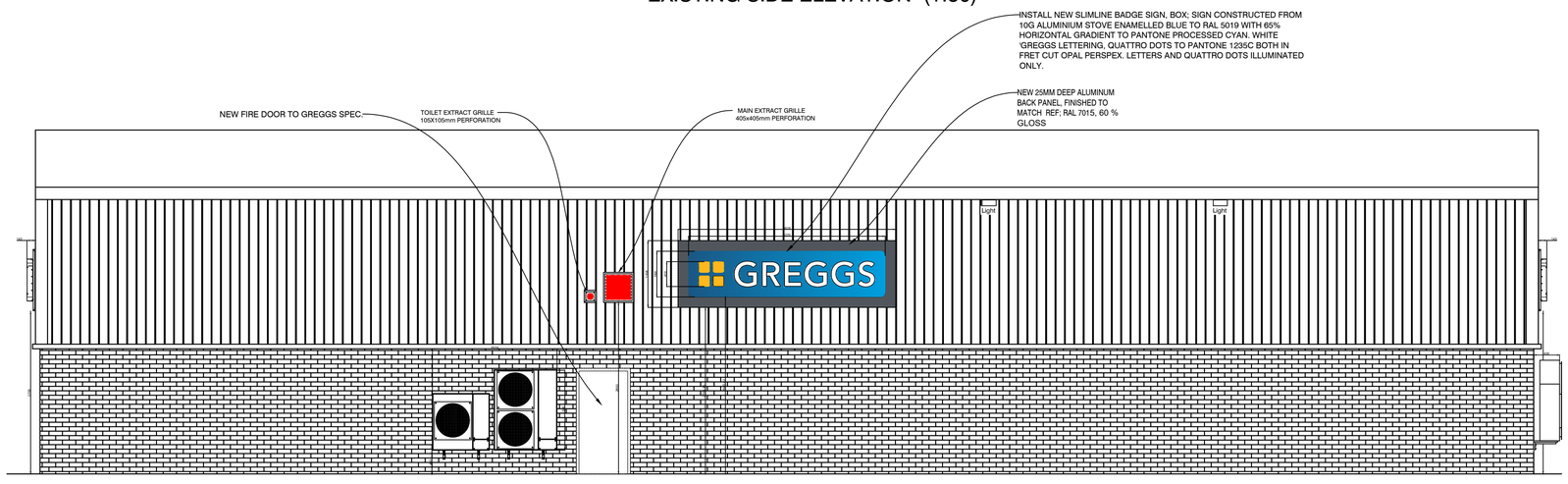
PROPOSED FRONT ELEVATION (1:50)



PROPOSED REAR ELEVATION (1:50)



EXISTING SIDE ELEVATION (1:50)

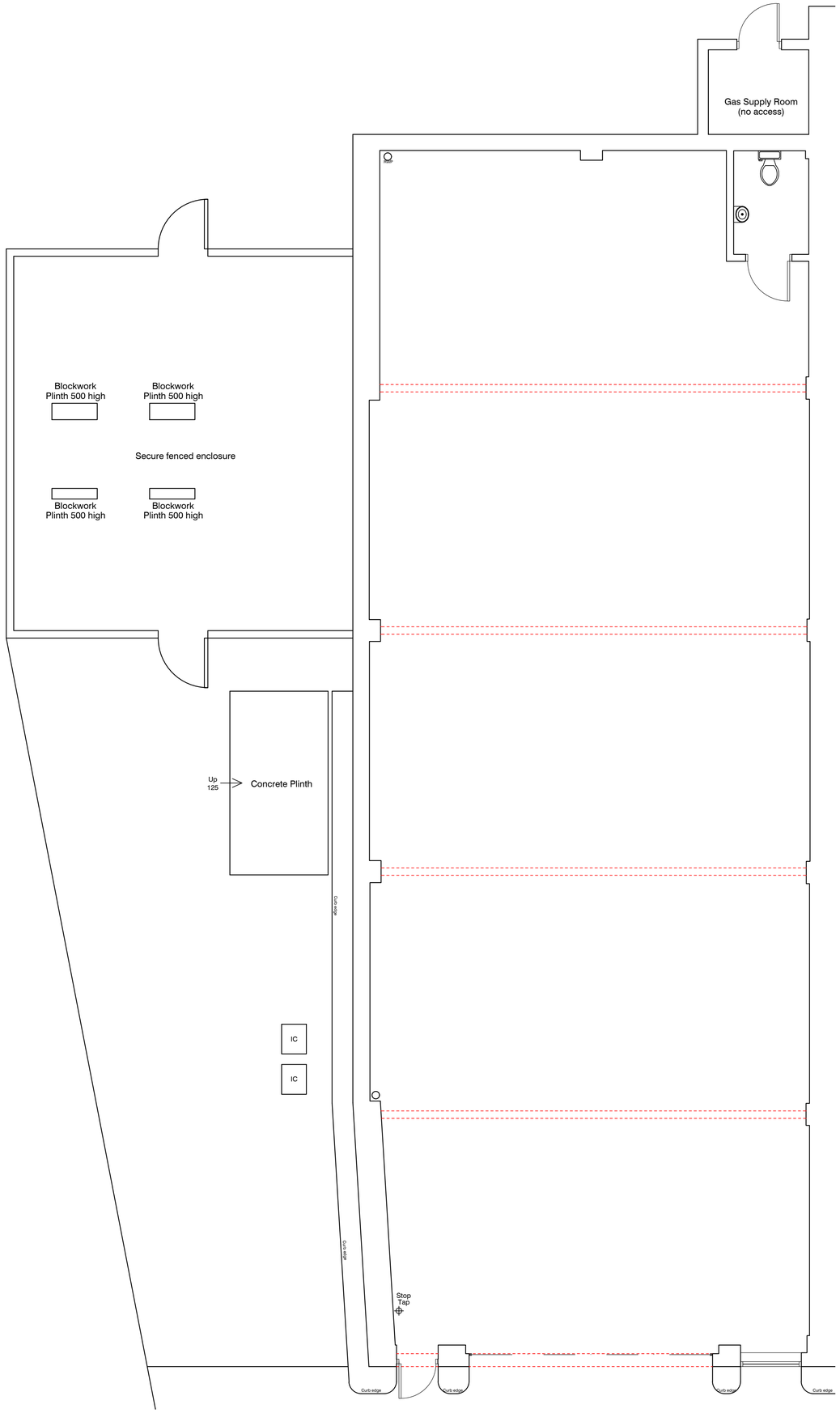


PROPOSED SIDE ELEVATION (1:50)

UNIT 1A WREXHAM MIDPOINT
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WREXHAM
WALES
LL13 7TF

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SCALE 1:50

S7000/COU/02



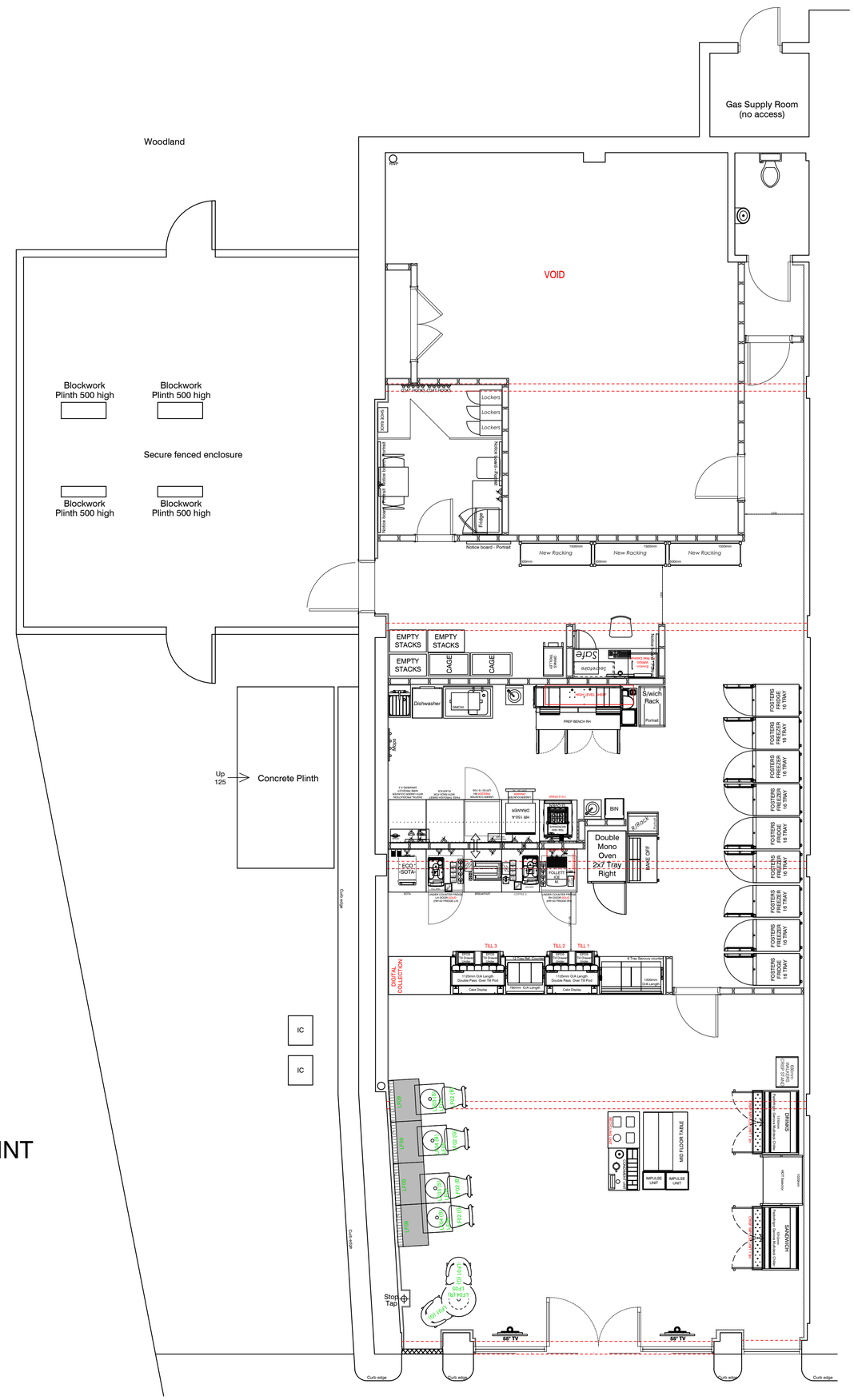
EXISTING GROUND FLOOR PLAN (1:50)

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DOLYDD ROAD
WREXHAM
WALES
LL13 7TF

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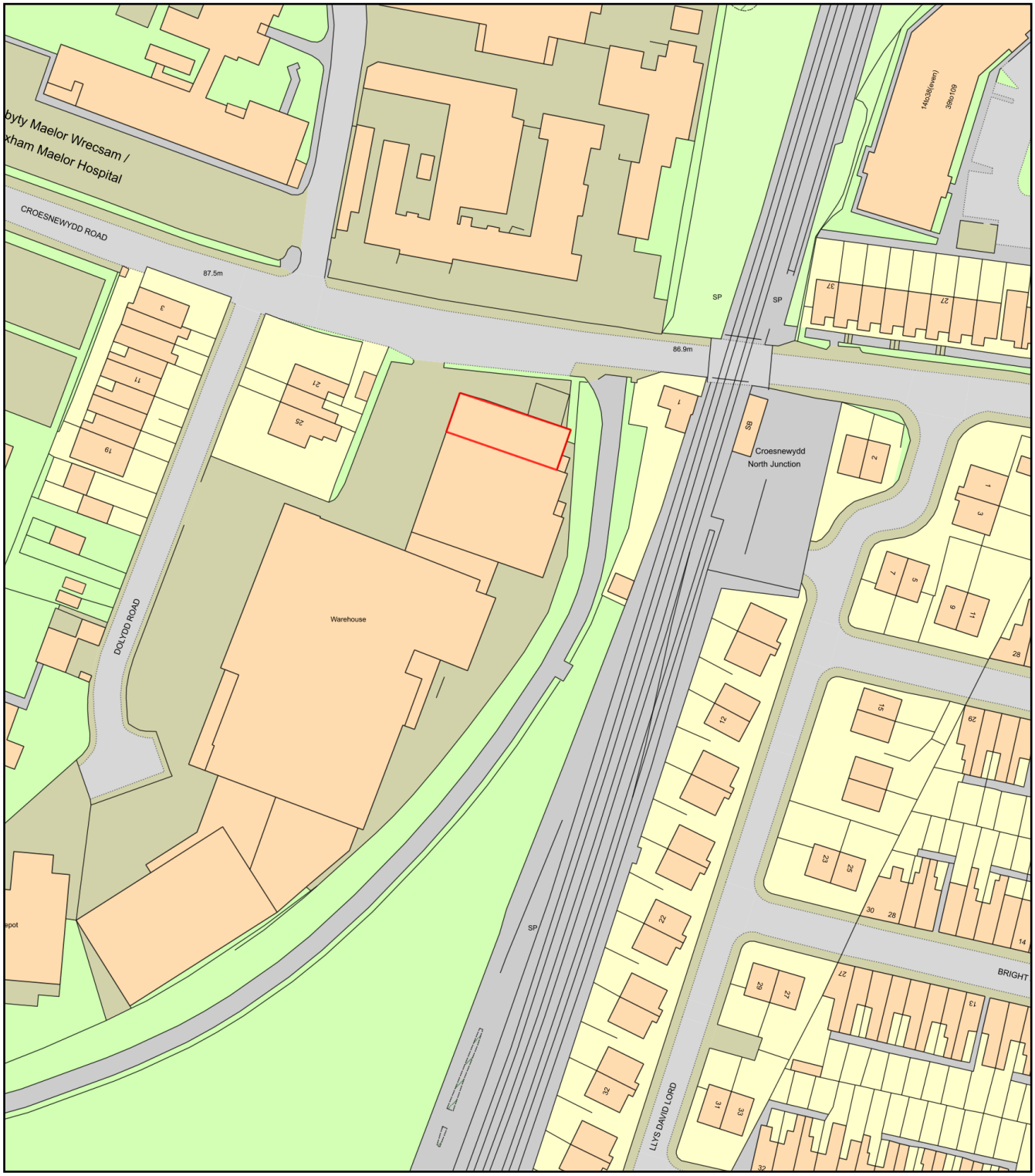
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PROPOSED GROUND FLOOR PLAN (1:50)

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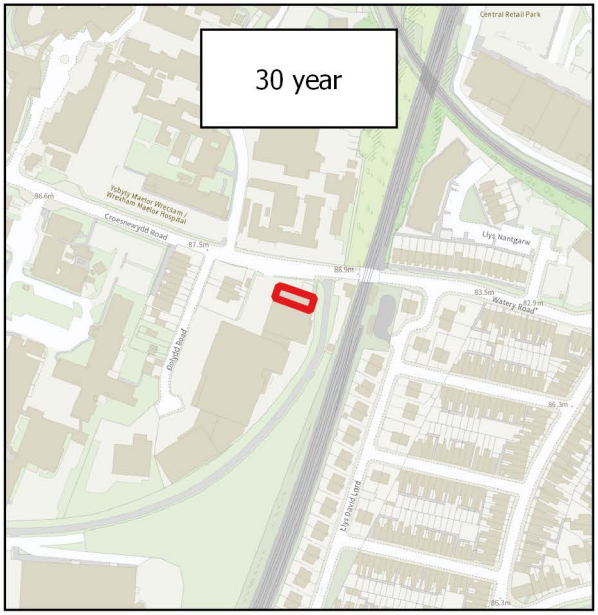
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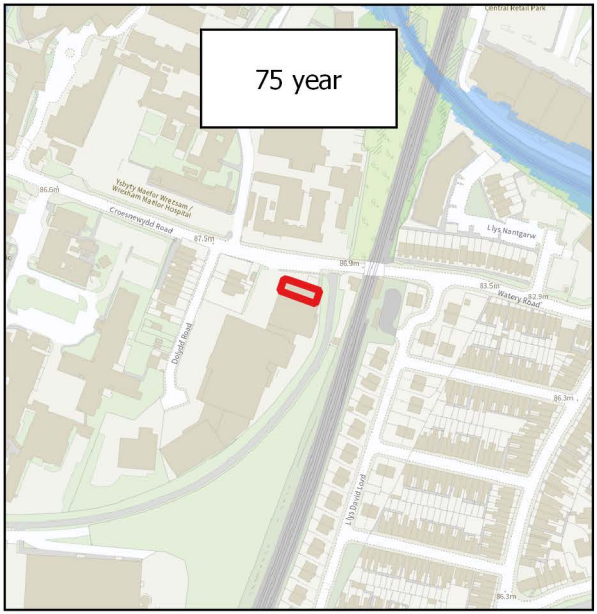
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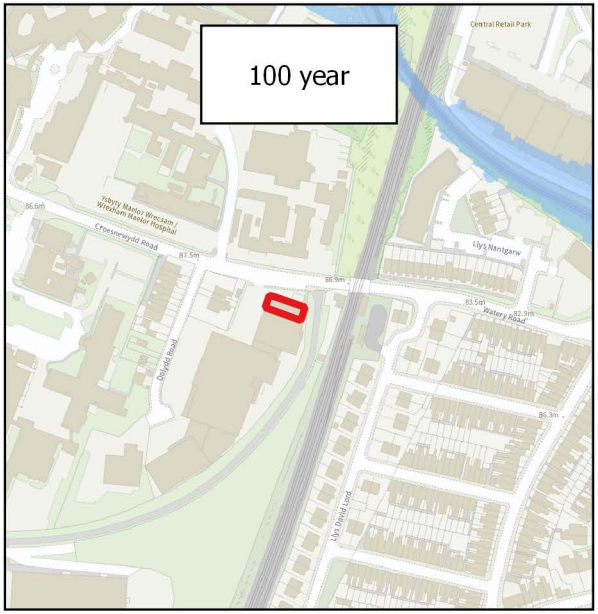
GeoSmart Information

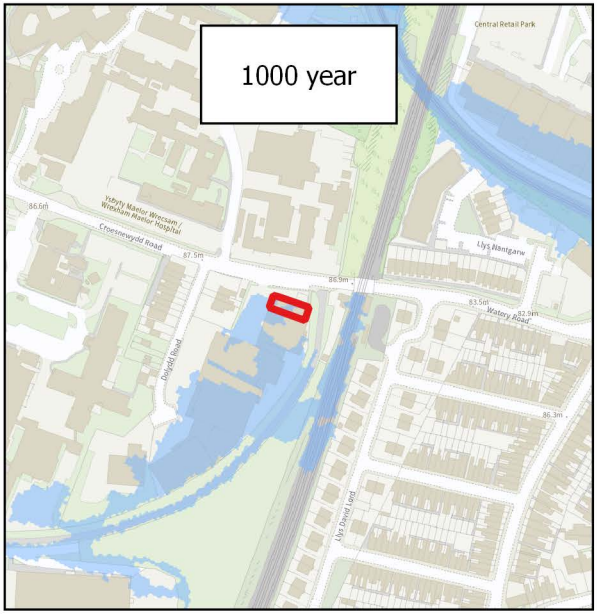
Appendix B

Natural Resource Wales data


30 year
Central Retail Park
Ysbyty Maelor Wrecsam / Wrexham Maelor Hospital
Croesnewydd Road
Llys Nantgarw
Watery Road
Doyden Road
Llys David Lord


75 year
Central Retail Park
Ysbyty Maelor Wrecsam / Wrexham Maelor Hospital
Croesnewydd Road
Llys Nantgarw
Watery Road
Doyden Road
Llys David Lord


100 year
Central Retail Park
Ysbyty Maelor Wrecsam / Wrexham Maelor Hospital
Croesnewydd Road
Llys Nantgarw
Watery Road
Doyden Road
Llys David Lord


1000 year
Central Retail Park
Ysbyty Maelor Wrecsam / Wrexham Maelor Hospital
Croesnewydd Road
Llys Nantgarw
Watery Road
Doyden Road
Llys David Lord

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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 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:

Liz Lloyd

Finance Manager

GeoSmart Information Limited

Suite 9-11, 1st Floor,

Old Bank Buildings,

Bellstone, Shrewsbury, SY1 1HU

Tel: 01743 298 100

support@geosmartinfo.co.uk

11. Terms and conditions, CDM regulations and data limitations

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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/