

WYNONA, STATION ROAD, ROSSETT

**FLOOD CONSEQUENCES ASSESSMENT
FINAL REPORT V1.0**

April 2021

Report Title	Wynona, Station Road, Rossett Flood Consequences Assessment Final Report v1.0
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1 INTRODUCTION

1.1 Purpose of Report

Weetwood Services Ltd ('Weetwood') has been instructed by Mr Ian Humphreys to prepare a Flood Consequences Assessment (FCA) report to accompany a full planning application for the proposed redevelopment of Wynona, Station Road, Rossett.

The flood risk assessment has been undertaken in accordance with the requirements of Technical Advice Note 15 (TAN15). However, surface water drainage is not included in this assessment and has been assessed independently.

1.1.1 Structure of the Report

The report is structured as follows:

Section 1	Introduction and report structure
Section 2	Provides background information relating to the development site, the development proposals, ground conditions, existing site access arrangements and the flood zone designation
Section 3	Presents national and local flood risk and drainage planning policy
Section 4	Assesses the potential sources of flooding to the development site
Section 5	Presents flood risk mitigation measures based on the findings of the assessment
Section 6	Presents a summary of key findings and the recommendations

1.2 Relevant Documents

The assessment has been informed by the following documents:

- Dee Preliminary Flood Risk Assessment (PFRA), Environment Agency & Natural Resources Wales, 2018
- Flood Risk Management Plan 2016 – 2021, Wrexham County Borough Council, 2016

2 SITE DETAILS AND PROPOSED DEVELOPMENT

2.1 Site Location

The approximately 0.08 hectare (ha) site is located between the River Alyn to the south and Station Road to the north. The site is approximately 194 m east of the A483 and 200 m west of Chester Road (B5445) at Ordnance Survey National Grid Reference SJ 363 571, as shown in **Figure 1**.

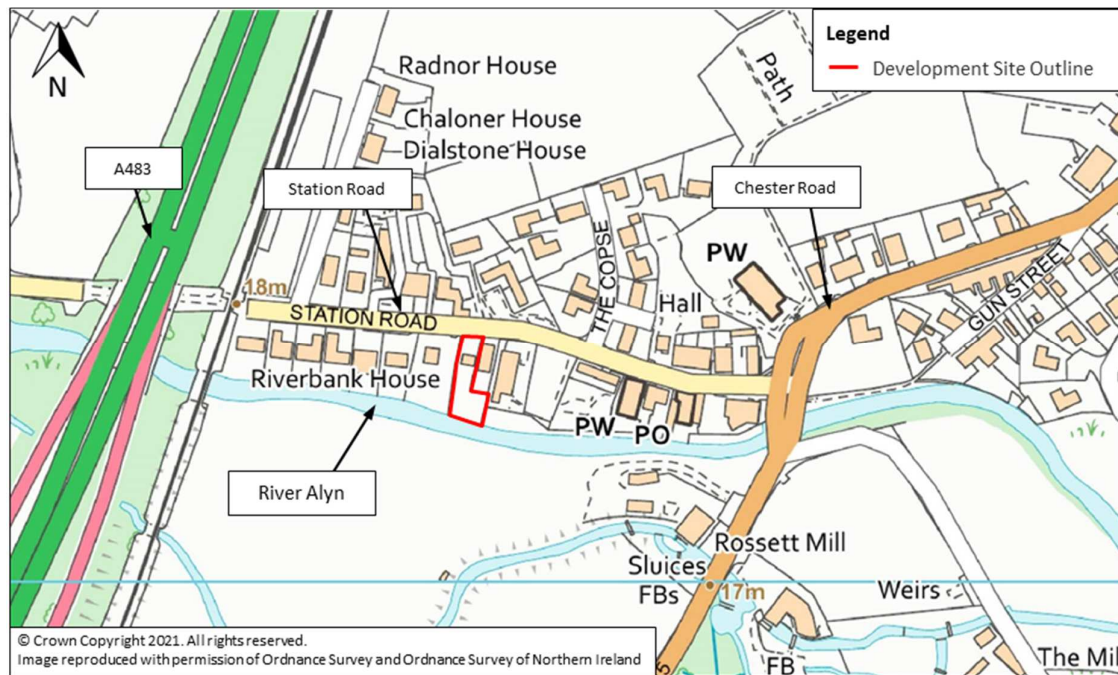


Figure 1: Site Location

2.2 Existing and Proposed Development

The site currently comprises an existing single-storey residential building (i.e. a bungalow) and associated amenity space.

The proposals are for the demolition of the existing bungalow and the construction of a two-storey residential dwelling comprising of three bedrooms and a detached garage.

The current building area is approximately 55 m² and the proposals are for a new 115 m² building and a new detached garage of approximately 14 m². The proposed development layout is provided in **Appendix A**.

TAN15 classifies residential development as Highly Vulnerable to flood risk. The existing site is therefore Highly Vulnerable, as is the proposed use.

2.3 Waterbodies in the Vicinity of the Site

The River Alyn is immediately south of the site boundary, flowing in an easterly direction. A second channel breaks away from the River Alyn approximately 300 m west of the site forming the River Alyn Race Rossett, which flows easterly through Mill Lades to confluence with the main channel 460 m east-south-east of the site. Both channels flow under the A483 and are classified as 'main rivers', as shown in **Figure 2**.

Natural Resources Wales carries out maintenance, improvement and construction work on main rivers to manage flood risk. Lead local flood authorities and district councils carry out flood risk management work on ordinary watercourses.

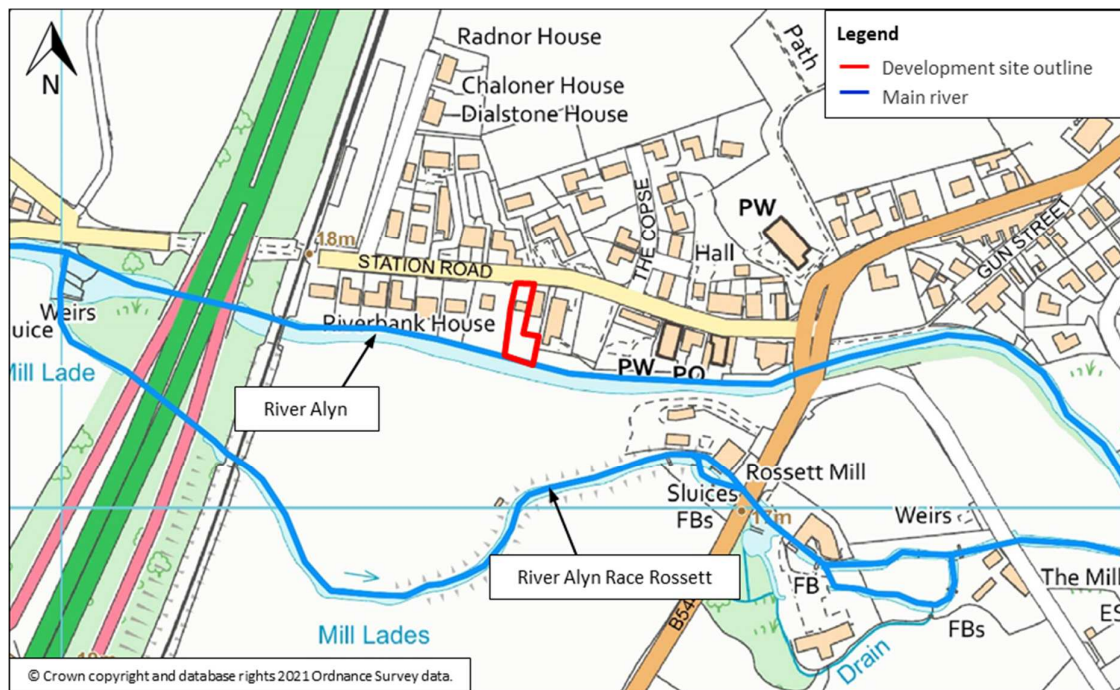


Figure 2: Location and Designation of Waterbodies

Source: Natural Resources Wales website; Accessed: March 2021

2.4 Ground Conditions

According to the Soilscape soils dataset produced by the Cranfield Soil and AgriFood Institute¹, soil conditions at the site and within the surrounding area are loamy, freely draining floodplain soils.

The National Geoscience Data Centre's Single Onshore Borehole Index² holds records of one borehole within 100 m of the site. The record indicates that sandy fine to coarse gravel and cobbles are present at a depth of 2.8 m below ground level (bgl) and are underlain by stiff clay layers with silt and traces of fine gravel to a depth of 18 m bgl.

British Geological Survey mapping of surface geology³ indicates the underlying bedrock formation comprises Salop formation bedrock (mudstone, sandstone and conglomerate), overlain by Alluvium made up of clay, silt, sand and gravel superficial deposits.

The British Geological Survey and Natural Resources Wales aquifer designation dataset⁴ classifies the Alluvium superficial deposits superficial deposits at the site as a Secondary A aquifer, whilst the underlying Salop formation bedrock is classified as a Secondary A aquifer. According to the Natural Resources Wales database⁵ the site is shown to be located within a designated groundwater source protection zone.

¹ www.landis.org.uk/soilscape/

² <https://www.bgs.ac.uk/products/onshore/SOBI.html>

³ <http://mapapps2.bgs.ac.uk/geoindex/home.html>

⁴ <https://www.bgs.ac.uk/datasets/aquifer-designation-data/>

⁵ <https://lle.gov.wales/catalogue/item/SourceProtectionZonesSPZMerged/?lang=en>

2.5 Site Levels

LiDAR data has been used to develop a digital terrain model of the site and surrounding area as illustrated in **Figure 3**. Site levels are in the region of 15.45 to 17.59 m Above Ordnance Datum (AOD), with levels falling away to the south.

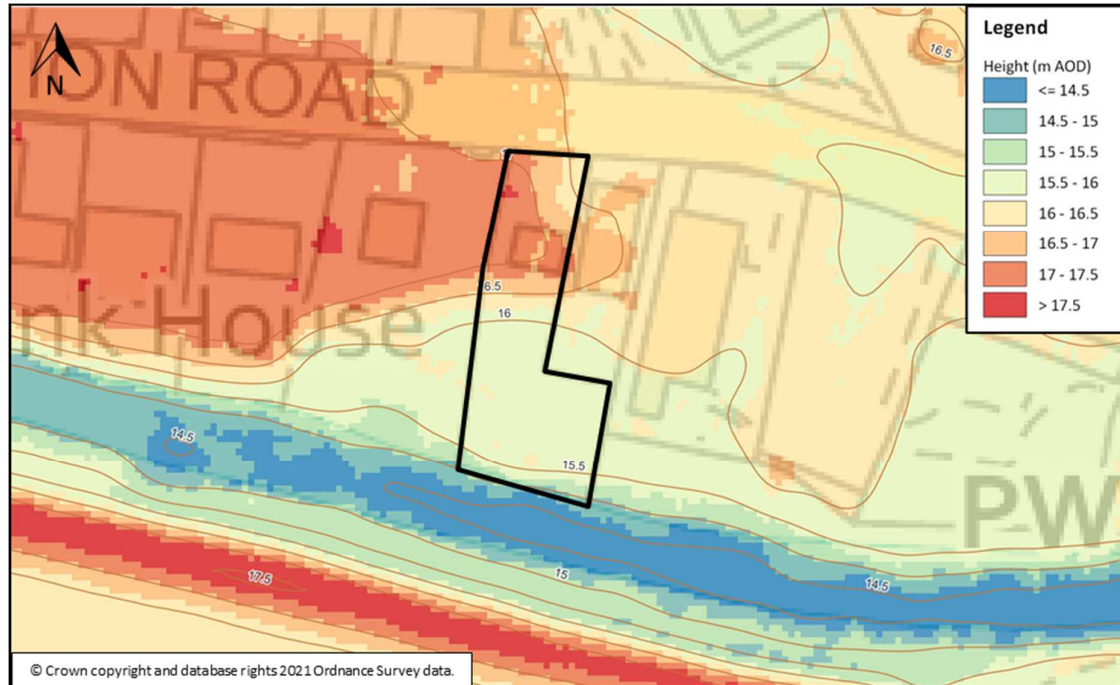


Figure 3: Digital Terrain Model from LiDAR Data

2.6 Access and Egress

The site is accessed from the north via Station Road. Levels on Station Road are shown to be 16.58 m AOD adjacent to the site and rise to the west.

2.7 Flood Zone Designation

Figure 1 of TAN15 defines three development advice zones as follows:

- Zone A: Considered to be at little or no risk of fluvial or tidal/coastal flooding
- Zone B: Areas known to have been flooded in the past evidenced by sedimentary deposits
- Zone C: Based on [the Natural Resources Wales] flood outline, equal to or greater than 0.1% (river, tidal or coastal). Zone C is subdivided into the following two zones:
 - Zone C1: Areas of the floodplain which are developed and served by significant infrastructure, including flood defences
 - Zone C2: Areas of the floodplain without significant flood defence infrastructure

The development advice zones are shown on the Development Advice Map⁶ and are defined by the predicted extent of the 1 in 1,000 (rivers and sea) annual exceedance probability (AEP) event (zone C) and British Geological Survey drift data (zone B).

⁶ <https://maps.cyfoethnaturiolcymru.gov.uk/Html5Viewer/Index.html>

The Development Advice Map (**Figure 4**) indicates that the northern portion of the site is located in Zone B and the southern portion of the site is located in Zone C2.

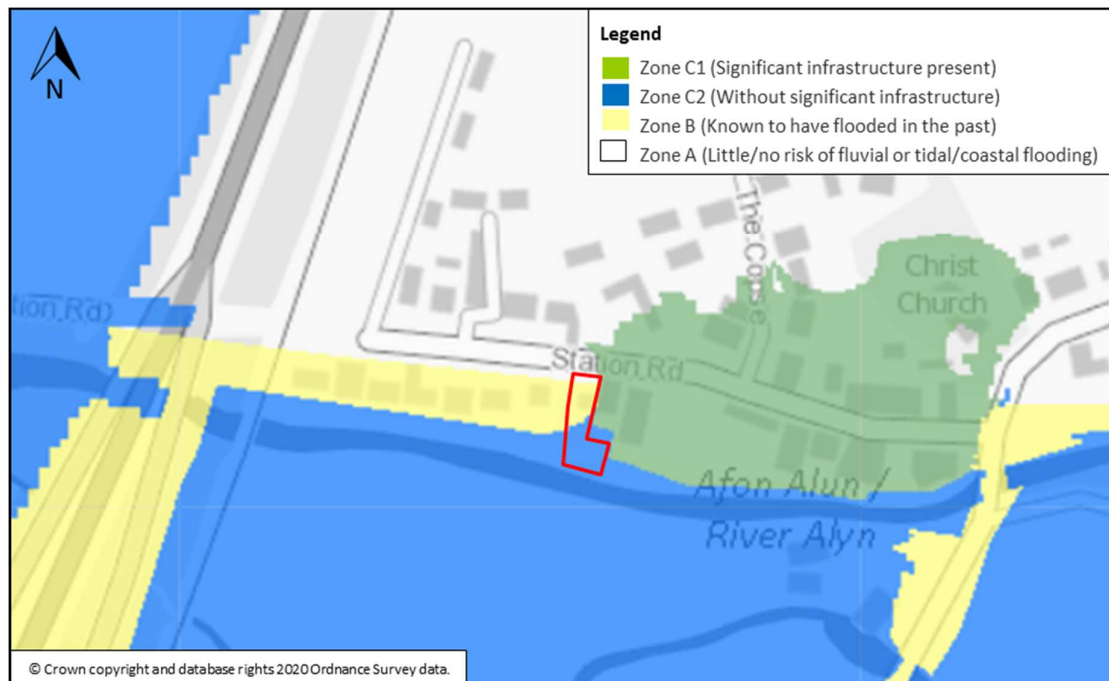


Figure 4: Development Advice Map

Source: Natural Resources Wales website; Accessed: March 2021

3 PLANNING POLICY AND GUIDANCE

3.1 Legislation Originating from the European Union

The Water Framework Directive (WFD) provides a legal framework for the protection, improvement and sustainable use of inland surface waters, groundwater, transitional waters, and coastal waters across Wales, and seeks to:

- Prevent deterioration in the status of aquatic ecosystems, protect them and improve the ecological condition of waters
- Achieve at least 'good' status for all waterbodies by 2015
- Promote the sustainable use of water as a natural resource
- Conserve habitats and species that depend directly on water
- Progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment
- Progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants; and
- Contribute to mitigating the effects of floods and droughts.

The WFD applies to any proposed development which has the potential to impact on a waterbody. Where this is the case, Natural Resources Wales may require evidence demonstrating that the proposed development does not compromise the aims of the WFD.

3.2 National Planning Policy and Guidance

Planning Policy Wales (PPW) sets out government's planning policies for Wales and how these are expected to be applied. TAN15 provides technical guidance which supplements the policy within PPW and seeks to ensure that flood risk is taken into account at all stages in the planning process and is appropriately addressed.

The general approach of TAN15 is to set out a precautionary framework to guide planning decisions in areas at high risk of flooding. The overarching aim of the framework is, in order of preference, to:

- Direct new development away from those areas which are at a high risk of flooding.
- Where development has to be considered in high risk areas (i.e. zone C) only those developments which can be justified should be located in such areas.

In accordance with paragraph 6 of TAN15, development will only be justified if it can be demonstrated that:

- i. Its location in zone C is necessary to assist, or be part of, a local authority regeneration initiative or a local authority strategy required to sustain an existing settlement; **or**,
- ii. Its location in zone C is necessary to contribute to key employment objectives supported by the local authority, and other key partners, to sustain an existing settlement or region;

and,

- iii. It concurs with the aims of PPW and meets the definition of previously developed land (PPW Figure 2.1); and,
- iv. The potential consequences of a flooding event for the particular type of development have been considered, and in terms of the criteria contained in sections 5 and 7 and appendix 1 found to be acceptable.

National policy requires that planning applications for new development proposals should incorporate sustainable drainage systems (SuDS) to appropriate operational standards and with maintenance arrangements in place unless there is clear evidence that this would be inappropriate.

Statutory standards for sustainable drainage were published by Welsh Government in October 2018⁷ in relation to the design, construction, operation and maintenance of sustainable drainage systems serving new developments of more than one house or where the construction area is equal to or greater than 100 square metres (m²). These standards set out how surface water runoff generated during the present day 1 in 1, 1 in 30 and 1 in 100 AEP rainfall events and for events exceeding the present day 1 in 100 AEP event should be managed, how peak runoff rates should be restricted and how runoff volumes should be controlled. Approval is subsequently required from the SuDS Approval Body (SAB) before construction can commence.

3.3 Local Planning Policy and Guidance

3.3.1 Unitary Development Plan, Wrexham County Borough Council, 2005

The Wrexham County Borough Council Unitary Development Plan is the adopted development plan for the 15 year period running from 1996 and 2011 and remains the development plan for the county whilst a new local development plan is currently being updated and still undergoing consultation.

Policy GDP1: Development Objectives

Ensure that development does not result in, or is subject to, flooding, soil erosion, landslides or contamination, either on or off the site.

Policy EC12: Development and Flood Risk

Development 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

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.

Policy EC13: Surface Water Run-off

Development which would result in an unacceptable adverse impact on the water environment due to additional surface water run-off will not be permitted.

Wherever practicable surface water should be disposed of as close to the source as possible. Where potential risks are identified appropriate flow attenuation facilities or mitigation measures may be a pre-requisite for development. Consideration should be given to the use of softer engineering structures referred to as Sustainable Urban Drainage Systems (SUDS).

3.3.2 Deposit Local Development Plan, Wrexham County Borough Council, April 2019

The Wrexham County Borough Council Deposit Local Development Plan is available on the Wrexham County Borough Council website for the 15 year period between 2013 – 2028, however this has not yet been adopted by the council.

Policy SP19: Climate Change

To mitigate against the effects of climate change and adapt to its impacts, development proposals will need to demonstrate that they have taken into account the following:

⁷ Statutory Standards for Sustainable Drainage Systems – designing, constructing, operating and maintaining surface water drainage systems (<https://gov.wales/sites/default/files/publications/2019-06/statutory-national-standards-for-sustainable-drainage-systems.pdf>)

- Avoiding areas susceptible to flood risk in the first instance in accordance with the sequential approach set out in national guidance; and
- Preventing development that increases flood risk and
- Assesses the potential effects of climate change when preparing a Flood Consequence Assessment for the site.

Policy DM1; Development Management Considerations

Development proposals, where relevant, must not increase the risk of flooding but makes adequate provision for sustainably dealing with foul and surface water drainage and not result in an unacceptable impact upon the water environment.

3.4 Environmental Permitting and Land Drainage Consent

Under the Environmental Permitting (England and Wales) Regulations 2016 an Environmental Permit for Flood Risk Activities⁸ is required from Natural Resources Wales for any permanent or temporary works:

- In, over or under a designated main river
- Within 8 m of the top of bank of a designated main river or of the landward toe of a flood defence (16 m if it is a tidal main river or a sea defence).

In addition, any permanent or temporary works within the floodplain of a designated main river may also require an Environmental Permit for Flood Risk Activities. A permit is separate to and in addition to any planning permission granted.

Land drainage consent may be required from the lead local flood authority for work to an ordinary watercourse.

If the location of an activity is on an ordinary watercourse that lies within an Internal Drainage District, land drainage consent may be required from Natural Resources Wales.

Undertaking activities controlled by local byelaws also requires the relevant consent.

⁸ <https://naturalresources.wales/permits-and-permissions/environmental-permits/?lang=en>

4 REVIEW OF FLOOD RISK

4.1 Justification Test

As the site is classified as being partly located in zone C2, any new development should only be permitted if the Justification Test is passed.

It is considered the redevelopment of the site will help sustain the existing settlement, meeting point (i) of the Justification Test. Point (iii) of the Justification Test is met as the site can be regarded as 'previously developed land'. This report aims to address point (iv) of the Justification Test.

The site already has a 'highly vulnerable' use, which will not be changed post-development. Therefore, its partial location in zone C2 is considered appropriate.

4.2 Historical Records of Flooding

Rossett has experienced historic flooding in 2012-2013 according to the Local Flood Risk Management Strategy⁹ and the Natural Resources Wales (NRW) historic flood outlines database¹⁰ indicates flooding within the rear amenity area of the site in November 2000 as illustrated in **Figure 3**.

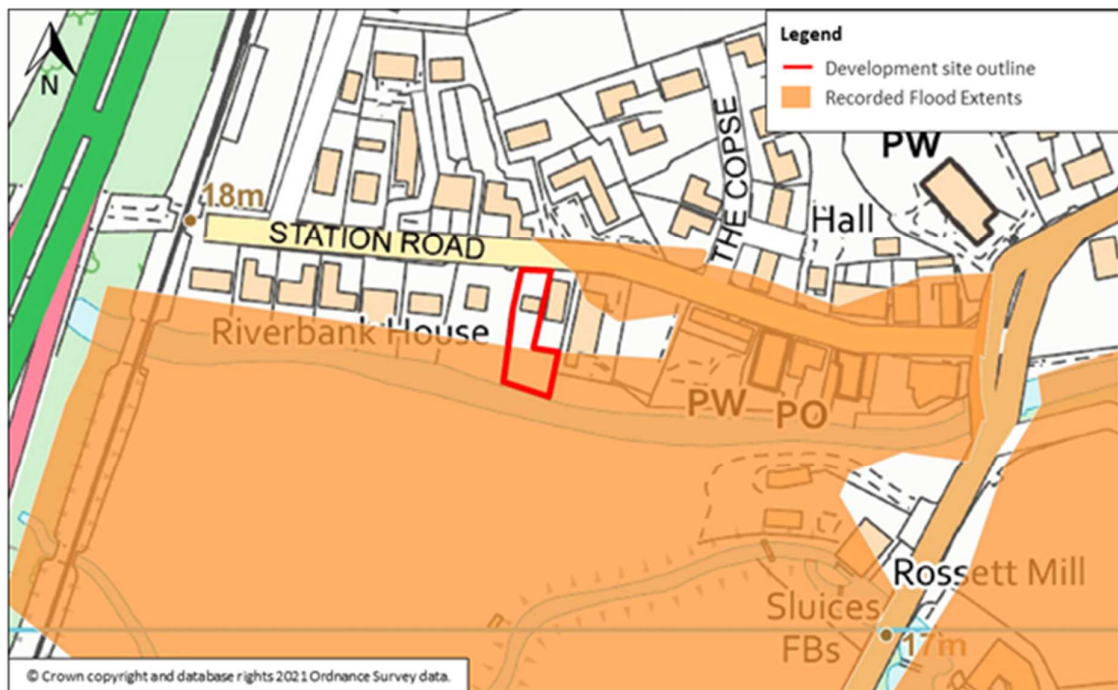


Figure 5: Natural Resources Wales Recorded Flood Extents

Source: NRW website, March 2021

4.3 Fluvial Flood Risk

As detailed in **Section 2.3**, the River Alyn is located along the southern boundary of the site and flows in a predominantly easterly direction.

⁹ Local Flood Risk Management Strategy, Wrexham County Borough Council, April 2013

¹⁰ <http://lle.gov.wales/catalogue/item/HistoricFI/?lang=en>

The NRW spatial flood defences database¹¹ indicates that a flood defence asset is located along the left bank of the River Alyn to the east of the site (**Figure 6**). The defence asset is not shown to protect the site from fluvial flooding.

The defence asset comprises of a steel sheet pile wall encased in concrete and brick clad with demountable barriers at the Alyn Pub. The defence crest levels range between 17.0 and 16.4 m AOD and the asset is in fair condition. The flood defences were originally built to provide protection up to a 1 in 200 AEP event.

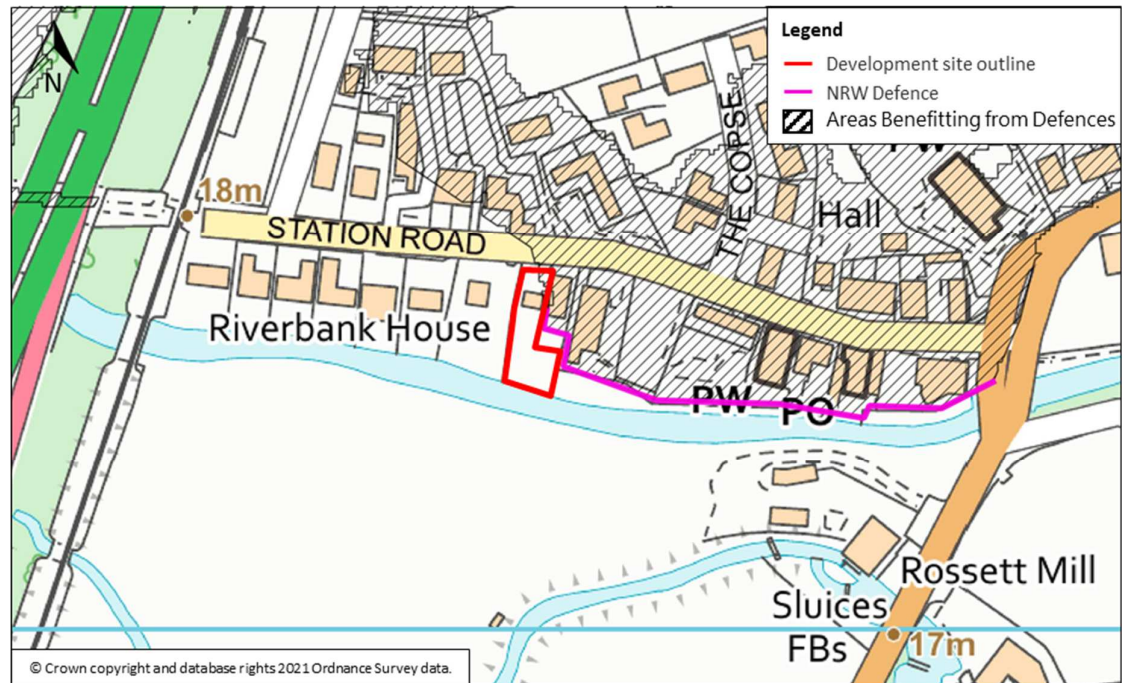


Figure 6: Existing Flood Defences

Source: NRW website, April 2021

A 1D-2D Flood Modeller Pro-TUFLOW hydraulic model of the River Alyn was developed by Jacobs as part of the Rossett Flood Risk Study, April 2021. This model assesses the risk of flooding from the River Alyn for the present day 1 in 20, 1 in 100, 1 in 1,000 AEP events and the 1 in 100 plus climate change (20%) AEP event.

Modelled flood depths have been provided¹² by NRW for the aforementioned defended events, and are presented in **Figure 7**. **Table 1** summarises the maximum level, depth and velocity of floodwaters expected at the site during the aforementioned scenarios.

It is assumed that the lifetime of the existing development will last beyond 2080. Therefore, in accordance with Welsh Government guidance¹³, a +20% (central) increase in peak river flow should be considered over the lifetime of the development to take account of the likely impacts of climate change.

The model outputs indicate that the present day 1 in 20 AEP flood outline is confined to a small area in the south of the site; therefore, the developable area of the site is not considered to be located within the functional floodplain. The flood extents for the other aforementioned AEP events are confined to the rear garden of the existing property.

¹¹ <http://lle.gov.wales/catalogue/item/SpatialFloodDefencesWithStandardisedAttributes/?lang=en>

¹² NRW reference ATI 21086a

¹³ Adapting to Climate Change: Guidance for Flood and Coastal Erosion Risk Management Authorities in Wales (<https://gov.wales/sites/default/files/publications/2019-06/adapting-to-climate-change-guidance-for-flood-and-coastal-erosion-riskmanagement-authorities-in-wales.pdf>)

Table 1: Site Flood Information (Defended)

AEP Event	Max Level (m AOD)	Max Depth (m)		Max Velocity (m/s)	
		Highest	Mean	Highest	Mean
Present day 1 in 20	15.79	*0.34	0.05	0.04	0.00
Present day 1 in 100	16.31	*0.86	0.36	0.61	0.23
1 in 100 plus climate change (20%)	16.53	*1.08	0.61	1.00	0.51
Present day 1 in 1,000	16.85	*1.40	0.82	1.24	0.67

* Maximum depth derived by max flood level minus lowest site level from LiDAR data, which should be more accurate.

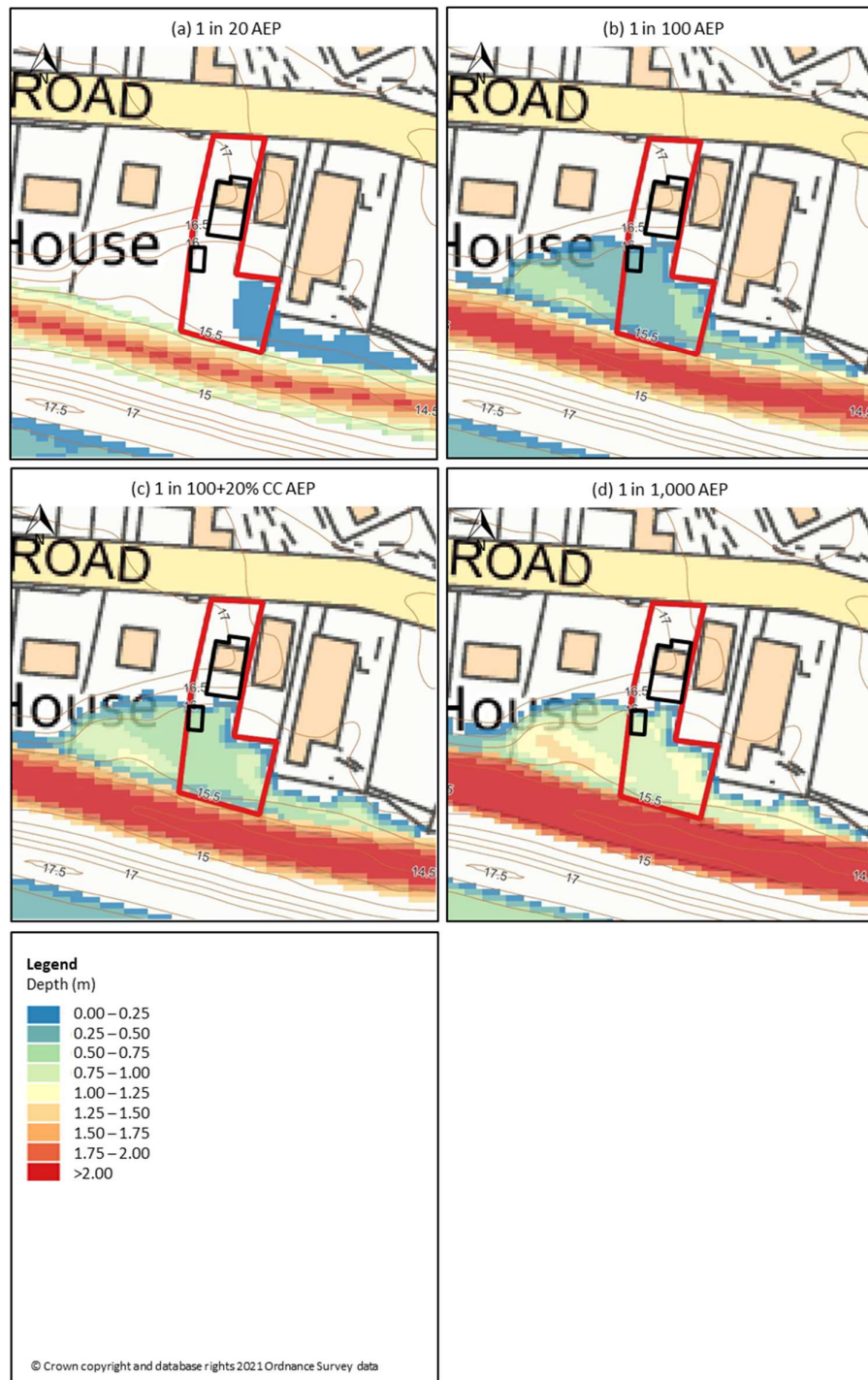


Figure 7: River Alyn Modelled Flood Depths (Defended)

Source: Rossett Flood Risk Study, Jacobs, April 2021

Regarding the residual risk of structure blockages that may impact the site, the Alyn Bridge is located 200 m east of the site where Chester Road crosses the River Alyn. It is considered that a blockage to the A483 bridge located to the west of the site is unlikely to adversely impact flood risk at the site as water would be expected to back up behind the embanked structure to the west and reduce the amount of river flow adjacent to the site.

In accordance with NRW guidance¹⁴, the Rossett Flood Risk Study, April 2021, has assessed blockage scenarios at Alyn Bridge for low (5%), medium (25%) and high (80%) proportion blockage scenarios. As outlined within Section 4.4 of the associated Final Report v2.0 dated April 2021, “*due to the size of the bridge, an 80% blockage is very unlikely*”. It should also be noted that the blockage scenarios have only been assessed for the 1 in 100 plus climate change (20%) AEP event and the present day 1 in 1,000 AEP event does not appear to have been considered for the NRW study, which is normally an NRW requirement.

Modelled outputs for the 1 in 100 plus climate change (20%) bridge blockage scenarios are provided in **Figure 8**. **Table 2** summarises the maximum level, depth and velocity of floodwaters expected at the site during the aforementioned defended scenarios.

Table 2: Site Flood Information (Bridge Blockage)

AEP Event	Max Level (m AOD)	Max Depth (m)		Max Velocity (m/s)	
		Highest	Mean	Highest	Mean
1 in 100 plus climate change (20%) plus 5% blockage	16.61	*1.16	0.62	1.00	0.53
1 in 100 plus climate change (20%) plus 25% blockage	16.80	*1.35	0.80	0.94	0.51
1 in 100 plus climate change (20%) plus 80% blockage	17.08	*1.63	0.78	0.74	0.34

* Maximum depth derived by max flood level minus lowest site level from LiDAR data, which should be more accurate.

¹⁴ NRW guidance note GN43: Modelling blockage and breach scenarios, September 2020

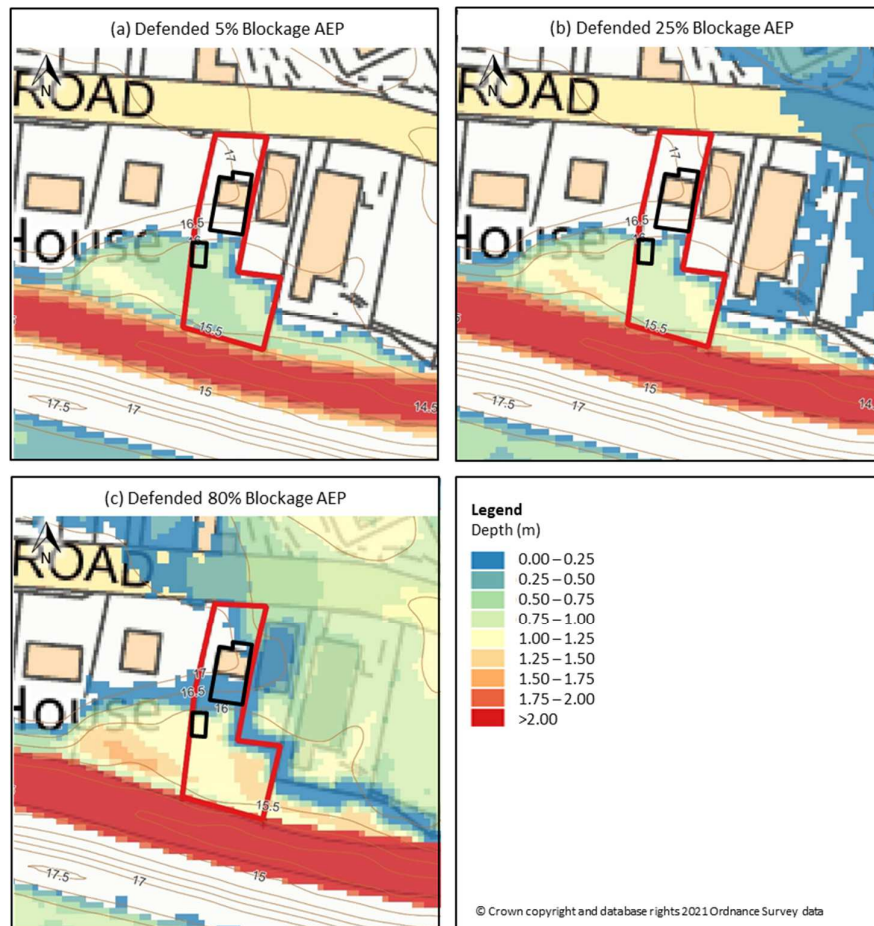


Figure 8: River Alyn Modelled Flood Depths (1 in 100 plus climate change (20%) blockage)

Source: Rossett Flood Risk Study, Jacobs, April 2021

As presented, during the 1 in 100 plus climate change (20%) AEP event there is an expected increase in flood level at the site of 0.08, 0.19 and 0.47 m for the 5%, 25% and 80% blockage scenarios respectively, with an expected reduction in velocities, owing to water backing up behind the structure.

As previously stated, there is no modelled data available for blockage scenarios during the present day 1 in 1,000 AEP event. However, to provide an indication of possible flood levels during this event, applying the same flood level increases between the modelled free-flowing 1 in 100 plus climate change (20%) AEP event and the 5%, 25% and 80% blockage scenarios, this would equate to potential flood levels of 16.93, 17.04 and 17.32 m AOD respectively. As ground levels at the site are assessed to range between 15.45 and 17.59 m AOD, this would equate to maximum flood depths of up to 1.48, 1.59 and 1.87 m, albeit such depths would be located along the southern boundary of the rear garden and some parts of the site should remain dry in the vicinity of the existing dwelling during all blockage scenarios. The ground level of Station Road adjacent to the site entrance is assessed to be approximately 16.58 m AOD, which would amount to maximum flood depths of 0.35, 0.46 and 0.74 m respectively. As previously stated, ground levels along station road rise to the west of the site.

Given that the site is not considered to benefit from flood defences according to the Development Advice Map owing to its partial zone C2 designation, and the location of defences is downstream of the site, a breach of the downstream flood defences is not expected to significantly impact the site.

4.4 Flood Risk from Surface Water and Small Watercourses

The Flood Risk from Surface Water and Small Watercourses map (**Figure 8**) indicates that the site and Station Road are at a Very Low risk of surface water flooding.

Station Road is shown to be at Very Low risk of surface water flooding.

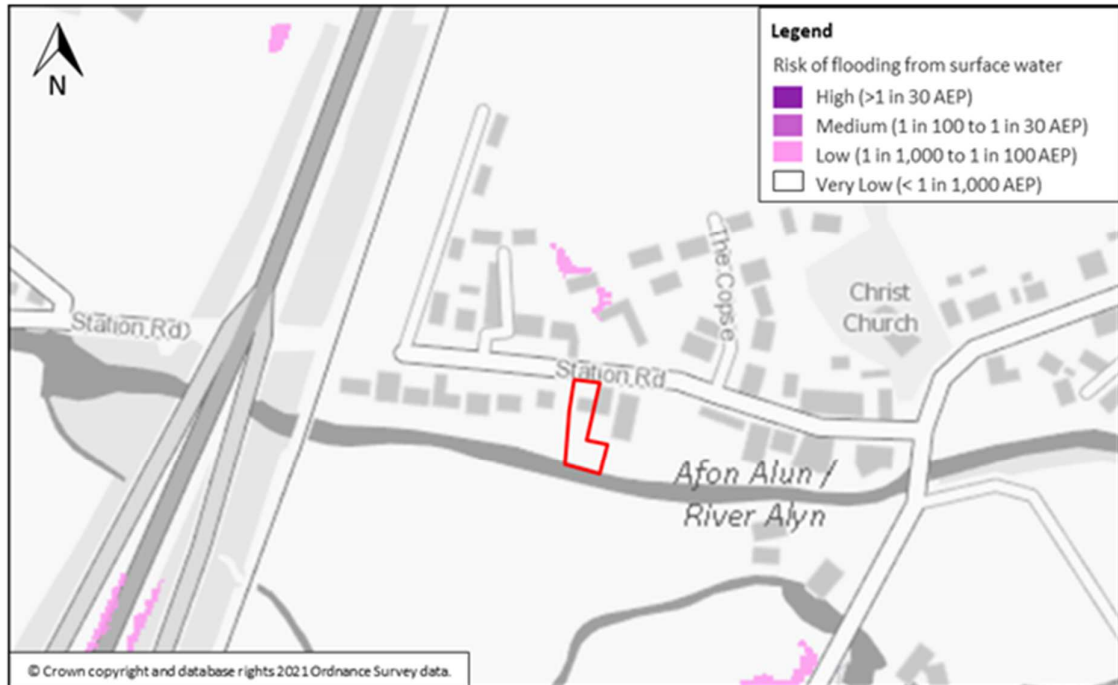


Figure 8: Flood Risk from Surface Water and Small Watercourses

Source: Natural Resources Wales website; Accessed: March 2021

4.5 Flood Risk from Reservoirs, Canals and Other Artificial Sources

There are no canals or other impounded waterbodies located within the immediate vicinity of the site. The site is therefore not assessed to be at risk of flooding from canals or other artificial sources.

The Reservoir Flood Risk map (**Figure 9**) indicates the site is at risk from reservoir flooding from a failure of the Nant-y-Ffrith Reservoir, located approximately 14 km south-west. However, all large reservoirs are regularly inspected by reservoir panel engineers with essential safety work carried out as required. As such, reservoir flooding is therefore extremely unlikely to occur.

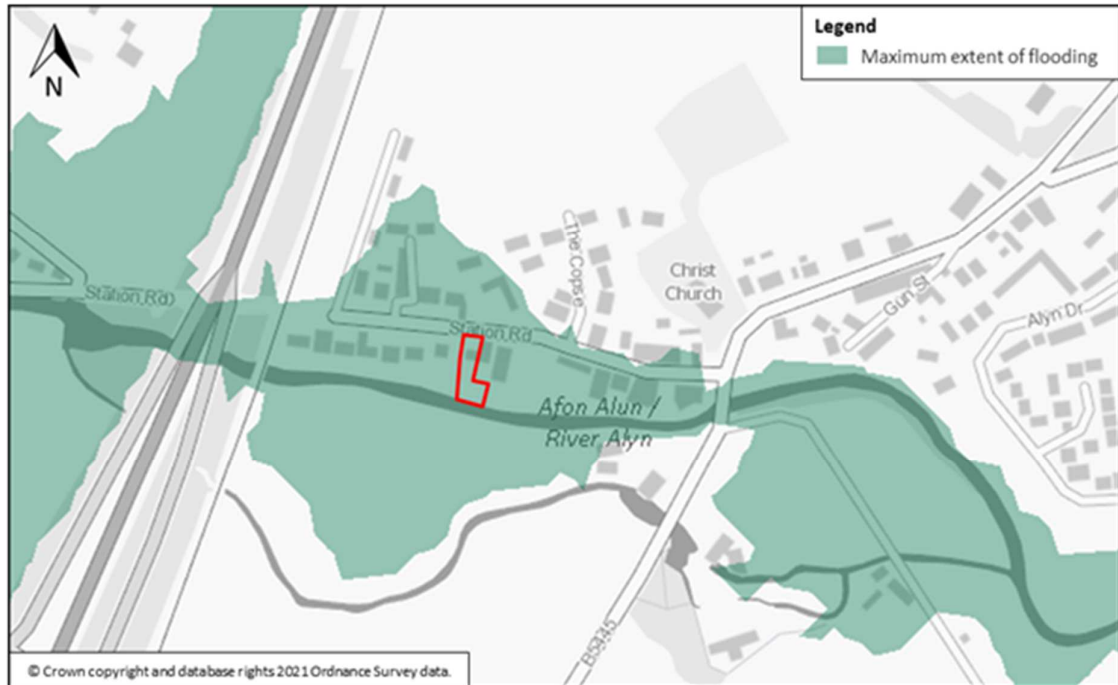


Figure 9: Reservoir Flood Risk

Source: Natural Resources Wales website; Accessed: March, 2021

4.6 Flood Risk from Groundwater

The British Geological Survey Groundwater Flooding Hazard map (**Figure 10**) indicates that the site has a 'significant' susceptibility of flooding from groundwater sources.

As detailed in **Section 2.4** ground conditions at the site are freely draining loamy soils. There may therefore be the propensity for some groundwater flooding in the vicinity of the site. However, the site slopes to the south towards the River Alyn. Therefore, emerging groundwater within the vicinity of the site would be expected to flow towards the River Alyn and away from the site without accumulating to significant depths at the site itself.

The risk of significant groundwater flooding at the site is therefore expected to be low.

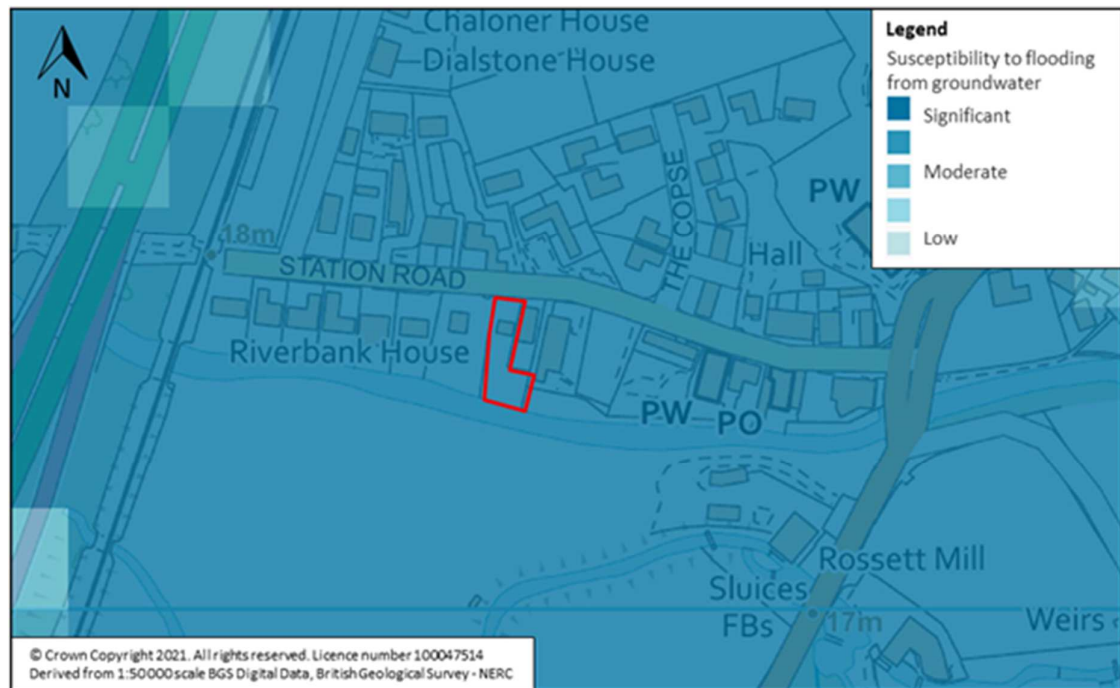


Figure 10: Groundwater Flooding Hazard Map

Source: Findmaps; Accessed: March 2021

5 FLOOD RISK MITIGATION MEASURES

The risk of flooding to the proposed development from fluvial sources and the residual risk of groundwater flooding will be mitigated through the implementation of the measures proposed within the following section of this report.

The proposed mitigation measures have considered what is feasible for the proposed redevelopment, recognising that the site is already highly vulnerable in nature. Whilst the proposed development may increase the amount of users at the site, the proposed redevelopment offers the opportunity for flood risk betterment compared to the existing situation.

5.1 Finished Floor Levels

In accordance with Natural Resources Wales interpretation of A1.14 of TAN15, finished floor levels and site levels should normally be raised above the 1 in 100 plus climate change AEP event flood level including breach/blockage. Finished floor level of the proposed residential dwelling should therefore be set at a minimum of 17.10 m AOD. This provides a freeboard of 300 mm above the peak modelled flood level for the 1 in 100 plus climate change (20%) AEP event including a 25% blockage to Alyn Bridge, expected at the site.

The proposed floor level would also be above the flood level expected during an 80% bridge blockage scenario; irrespective, the NRW Rossett Flood Risk Study modelling report indicates that an 80% blockage to the Alyn Bridge is considered highly unlikely owing to the large size of the bridge cross-sectional area. Therefore, it would be unreasonable to utilise that scenario to base mitigation measures upon.

Given the calculated flood level of 17.04 m AOD for the present day 1 in 1,000 AEP event during a 25% bridge blockage scenario, the proposed building should also remain dry during such conditions.

It is expected that a finished floor level of 17.10 m AOD will be higher than the existing building, which would provide flood risk betterment; however, a topographic survey has not been made available to confirm this. The proposed finished floor level of the new dwelling should also be set no lower than the finished floor level of the existing bungalow.

It should be noted that the proposed dwelling will have two-storeys, which will provide flood risk betterment compared to the existing single-storey bungalow.

In accordance with Building Regulations Approved Document C¹⁵, finished floor levels of buildings should be set at a minimum of 0.15 m above adjacent ground levels.

This will, subject to the implementation of an appropriately designed surface water drainage scheme, enable any potential overland flows to be conveyed safely across the site without affecting property.

5.2 Flood Resistant and Resilient Construction

Flood resistant and resilient construction techniques should be incorporated into the design of the garage where feasible¹⁶ up to a level of 17.10 m AOD. These include design features and finish materials to minimise the entry of water and/or reduce the damage in the unlikely event of the development being inundated.

5.3 Flood Risk Elsewhere

Any proposal to modify ground levels should demonstrate that there is no increase in flood risk to the development itself, or to any existing buildings which are known to, or are likely to flood.

¹⁵ Approved Document C - Site preparation and resistance to contaminants and moisture, 2004 edition (with 2010 and 2013 amendments)

¹⁶ Guidance on the Code of Practice for Property Flood Resilience, Edition 2, C790B. CIRIA London 2020

In accordance with A1.2 of TAN15 developers must ensure there will be no loss of flood flow or flood storage capacity for floods up to the severity of the 1 in 1,000 AEP event. Whilst not specified by TAN15, Natural Resources Wales generally recommends that this should be the case over the lifetime of development (i.e. should take into account climate change) and should consider breach and blockage scenarios where necessary.

No significant increases to existing ground levels throughout the site are expected following redevelopment.

The existing land that is proposed to accommodate a new residential building and external garage is expected to flood during the 'worst case scenario' 1 in 1,000 AEP event including a 25% bridge blockage. Note, it is not considered reasonable to assess flood risk elsewhere accounting for an 80% bridge blockage given that it is a highly unlikely event owing to the large cross-sectional area of the structure.

Given the calculated flood level of 17.04 m AOD, the volume of fluvial floodwater that may be displaced during a 1 in 1,000 AEP event including a 25% bridge blockage is calculated to be 47 m³, which is based on existing average ground levels (derived from latest available LiDAR data) within the areas that will include new buildings. To mitigate potential increases in flood risk elsewhere, it is proposed to incorporate compensatory flood storage into the site. Given the relative small size of the site, it will not be feasible to provide this on a level for level basis and a volumetric compensation is therefore proposed.

The amenity area in the southern portion of the site has an area of approximately 360 m². It is proposed to lower this area uniformly by 130 mm, which equates to a volume of 47 m³ of cut material that will increase floodplain storage in the rear garden area, compensating for the loss of floodplain storage elsewhere in the site.

5.4 Access and Egress

Access and Egress is provided via Station Road to the north of the site.

Modelled outputs indicate that dry access and egress is expected in up to the present day free-flowing 1 in 1,000 AEP fluvial event.

The maximum flood depth along Station Road adjacent to the site during the calculated present day 1 in 1,000 AEP event including a 25% blockage to Alyn Bridge is 0.46 m. As previously stated, an 80% blockage scenario is considered highly unlikely.

Therefore, emergency vehicular access may well be feasible during bridge blockage conditions. Irrespective, the same flood risk would be present for the existing highly vulnerable bungalow at the site. In the eventuality that the site is inaccessible, the proposed redevelopment offers betterment compared to the existing situation given the presence of a first floor.

6 SUMMARY AND RECOMMENDATIONS

This report has been prepared on behalf of Mr Ian Humphreys and relates to the proposed redevelopment of Wynona, Station Road, Rossett.

The development proposals include replacing the existing single-storey residential dwelling of highly vulnerable use, to be replaced with a new two-storey residential dwelling and garage.

According to the Development Advice Map the southern portion of the proposed development site is located within zone C2 and the northern portion of the site is located within zone B.

It is considered the redevelopment of the site will help sustain the existing settlement, meeting point (i) of the Justification Test. Point (iii) of the Justification Test is met as the site can be regarded as 'previously developed land'. This report aims to address point (iv) of the Justification Test.

The site already has a 'highly vulnerable' use, which will not be changed post-development. Therefore, its partial location in zone C2 is considered appropriate.

The River Alyn is located along the southern boundary of the site. The model outputs indicate that the present day 1 in 20 AEP flood outline is confined to a small area in the south of the site; therefore, the developable area of the site is not considered to be located within the functional floodplain. The flood extents for the modelled 1 in 100, 1 in 100 plus climate change (20%) and 1 in 1,000 AEP events are confined to the rear garden of the existing property.

There is residual risk of a blockage to Alyn Bridge, located downstream of the site, which would result in additional flooding to the site.

The Flood Risk from Surface Water and Small Watercourses map indicates that the site and Station Road is at a Very Low risk of surface water flooding.

The Reservoir Flood Risk map indicates the site is at risk from reservoir flooding from a failure of the Nant-y-Ffrith Reservoir, located approximately 14 km south-west. However, all large reservoirs are regularly inspected by reservoir panel engineers with essential safety work carried out as required. As such, reservoir flooding is therefore extremely unlikely to occur.

The risk of significant groundwater flooding at the site is expected to be low.

This report has demonstrated that the proposed development may be completed in accordance with the requirements of planning policy subject to the following:

- Finished floor levels to be set at a minimum of 17.10 m AOD and be at least 0.15 m above adjacent ground levels
- The proposed finished floor level of the new dwelling should also be set no lower than the finished floor level of the existing bungalow
- Flood resilient construction to be applied to the proposed dwelling where feasible up to a level of 17.10 m AOD
- The 360 m² amenity area in the southern portion of the site to be lowered by 130 mm to provide compensatory flood storage

Modelled outputs indicate that dry access and egress is expected in up to the present day free-flowing 1 in 1,000 AEP fluvial event.

The maximum flood depth along Station Road adjacent to the site during the calculated present day 1 in 1,000 AEP event including a 25% blockage to Alyn Bridge is 0.46 m. As previously stated, an 80% blockage scenario is considered highly unlikely.

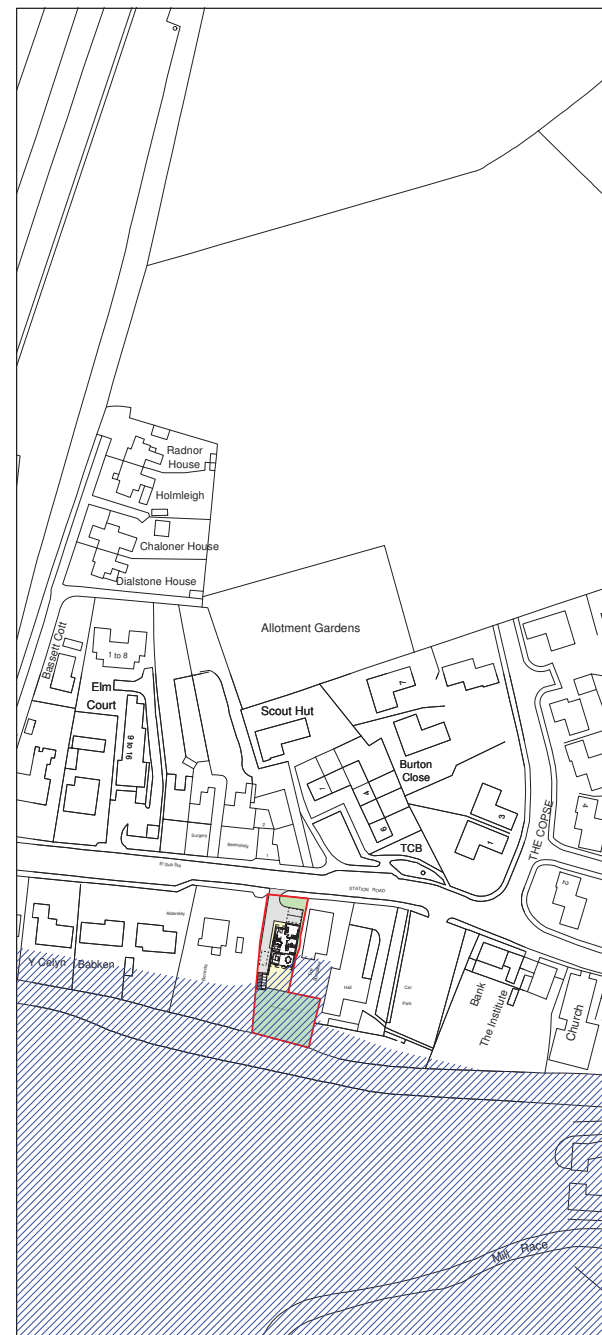
Therefore, emergency vehicular access may well be feasible during bridge blockage conditions. Irrespective, the same flood risk would be present for the existing highly vulnerable bungalow at the site. In the eventuality that the site is inaccessible, the proposed redevelopment offers betterment compared to the existing situation given the presence of a first floor.

APPENDIX A

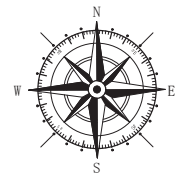
Development Proposals



Site Plan 1:250



Location Plan 1:1250



A	01/21	C2 Zone Indicated	D J F
Rev	Date	Detail	Initial

Project: Proposed replacement dwelling at, Station Road, Rossett, Wrexham, LL12 0HE.

Title: Planning Scale: (A2) 1:250 & 1:1250

Drawn By: J Felgate Date: Sep 2020

Drawing No: H125/005 Sheet: 1 of 1

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