

# **Conwy Stage 2 Strategic Flood Consequence Assessment - Land at Penloyn, to the East of the A470, Llanrwst (Site 56)**

**Final Report**

July 2025

Prepared for:

Conwy County Borough Council

[www.jbaconsulting.com](http://www.jbaconsulting.com)



## Document Status

Issue date	7 July 2025
Issued to	Richard Clarke
BIM reference	NQF-JBA-XX-XX-RP-Z-0002
Revision	P03
Prepared by	Laura Thompson BSc Analyst
Reviewed by	Mike Williamson BSc MSc CGeog FRGS EADA Principal Analyst
Authorised by	Krista Keating BSc MSc CEnv CSci MCIWEM C.WEM Associate Director

---

## Carbon Footprint

The format of this report is optimised for reading digitally in pdf format. Paper consumption produces substantial carbon emissions and other environmental impacts through the extraction, production and transportation of paper. Printing also generates emissions and impacts from the manufacture of printers and inks and from the energy used to power a printer. Please consider the environment before printing.

---

# Contract

JBA Project Manager	Mike Williamson
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2024s1111

This report describes work commissioned by Conwy County Borough Council by an instruction dated 22 July 2024. The Client's representative for the contract was Richard Clarke of Conwy County Borough Council. Laura Thompson of JBA Consulting carried out this work.

## Purpose and Disclaimer

Jeremy Benn Associates Limited ("JBA") has prepared this Report for the sole use of Conwy County Borough Council and its appointed agents in accordance with the Agreement under which our services were performed.

JBA has no liability for any use that is made of this Report except to Conwy County Borough Council for the purposes for which it was originally commissioned and prepared.

No other warranty, expressed or implied, is made as to the professional advice included in this Report or any other services provided by JBA. This Report cannot be relied upon by any other party without the prior and express written agreement of JBA.

The conclusions and recommendations contained in this Report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate. Information obtained by JBA has not been independently verified by JBA, unless otherwise stated in the Report.

The methodology adopted and the sources of information used by JBA in providing its services are outlined in this Report. The work described in this Report was undertaken between 22 July 2024 and 7 July 2025 and is based on the conditions encountered and the information available during the said period. The scope of this Report and the services are accordingly factually limited by these circumstances.

JBA disclaims any undertaking or obligation to advise any person of any change in any matter affecting the Report, which may come or be brought to JBA's attention after the date of the Report.

Certain statements made in the Report that are not historical facts may constitute estimates, projections or other forward-looking statements and even though they are based on reasonable assumptions as of the date of the Report, such forward-looking statements by their nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted. JBA specifically does not guarantee or warrant any estimates or projections contained in this Report.

Copyright

© Jeremy Benn Associates Limited 2025

---

# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
<b>2</b>	<b>Site description</b>	<b>2</b>
2.1	Site summary	2
2.2	Development proposal	3
2.3	Watercourses and flood defences	3
2.4	Site topography	4
<b>3</b>	<b>Assessment of the site against Flood Risk Assessment Wales data</b>	<b>5</b>
3.1	Flood Risk from the Sea	5
3.2	Flood Risk from Rivers	6
3.3	Flood Risk from Surface Water and Small Watercourses	7
3.4	Flood Risk from Reservoirs	9
3.5	Flood risk from groundwater (not in FRAW)	10
3.6	Summary of flood risk	11
<b>4</b>	<b>TAN-15</b>	<b>12</b>
4.1	Flood Map for Planning	12
4.2	Vulnerability to Flooding	15
4.3	New Development and Redevelopment	17
4.4	Acceptability of flood consequences	17
<b>5</b>	<b>Conclusion</b>	<b>18</b>
<b>6</b>	<b>Licencing</b>	<b>19</b>

## List of Figures

Figure 2-1 Site location	2
Figure 2-2 Watercourses	3
Figure 2-3 Site topography	4
Figure 3-1 FRAW - Flood Risk from the Sea	5
Figure 3-2 FRAW - Flood Risk from Rivers	6
Figure 3-3 FRAW - Flood Risk from Surface Water and Small Watercourses	8
Figure 3-4 FRAW - Flood Risk from Reservoirs	9
Figure 3-5 JBA 5m Groundwater Flood Map	10
Figure 4-1 FMfP - Flood Risk from Rivers and the Sea	14
Figure 4-2 FMfP - Flood Risk from Surface Water and Small Watercourses	15

## List of Tables

Table 3-1 Flood Risk from the Sea risk band definitions	6
Table 3-2 Flood Risk from Rivers risk band definitions	7
Table 3-3 Flood Risk from Surface Water and Small Watercourses risk band definitions	8
Table 3-4 Groundwater Flood Hazard Classification	11
Table 4-1 TAN-15 Definition of the FMfP flood zones	12
Table 4-2 Development vulnerability categories	16

# 1 Introduction

Conwy County Borough Council has commissioned JBA Consulting to prepare an independent Flood Risk Appraisal as part of a Stage 2 Strategic Flood Consequence Assessment (SFCA), for an allocation in its Replacement Local Development Plan (RLDP); Land to the East of the A470, Llanrwst. This Flood Risk Appraisal will be used to understand the appropriateness of development at the site per Welsh Government Policy, as set out in Technical Advice Note 15 (TAN-15): Development Flooding and coastal Erosion (March 2025) and includes a review of Natural Resources Wales (NRW) flood mapping.

## 2 Site description

### 2.1 Site summary

Site 56	
Location	Land to the East of the A470, Llanrwst
Existing site use	Agriculture
Existing site use vulnerability	Water compatible
Proposed site use	Residential (approx. 100 dwellings)
Proposed site use vulnerability	Highly vulnerable development
Site area	5.5 hectares

The proposed site is located within the centre of the County of Conwy in the electoral ward of Llanrwst a Llanddoged and is approximately 5.5 hectares in area. The site is located on greenfield land, currently used for agricultural purposes. The site is bounded by the A470 to the west, and residential development to the south and east. Greenfield land is present to the north of the site. North Llanrwst railway station is located to the southwest of the site. The main access to the site will be via the A470 to the west. An overview of the location of the site can be seen in Figure 2-1.

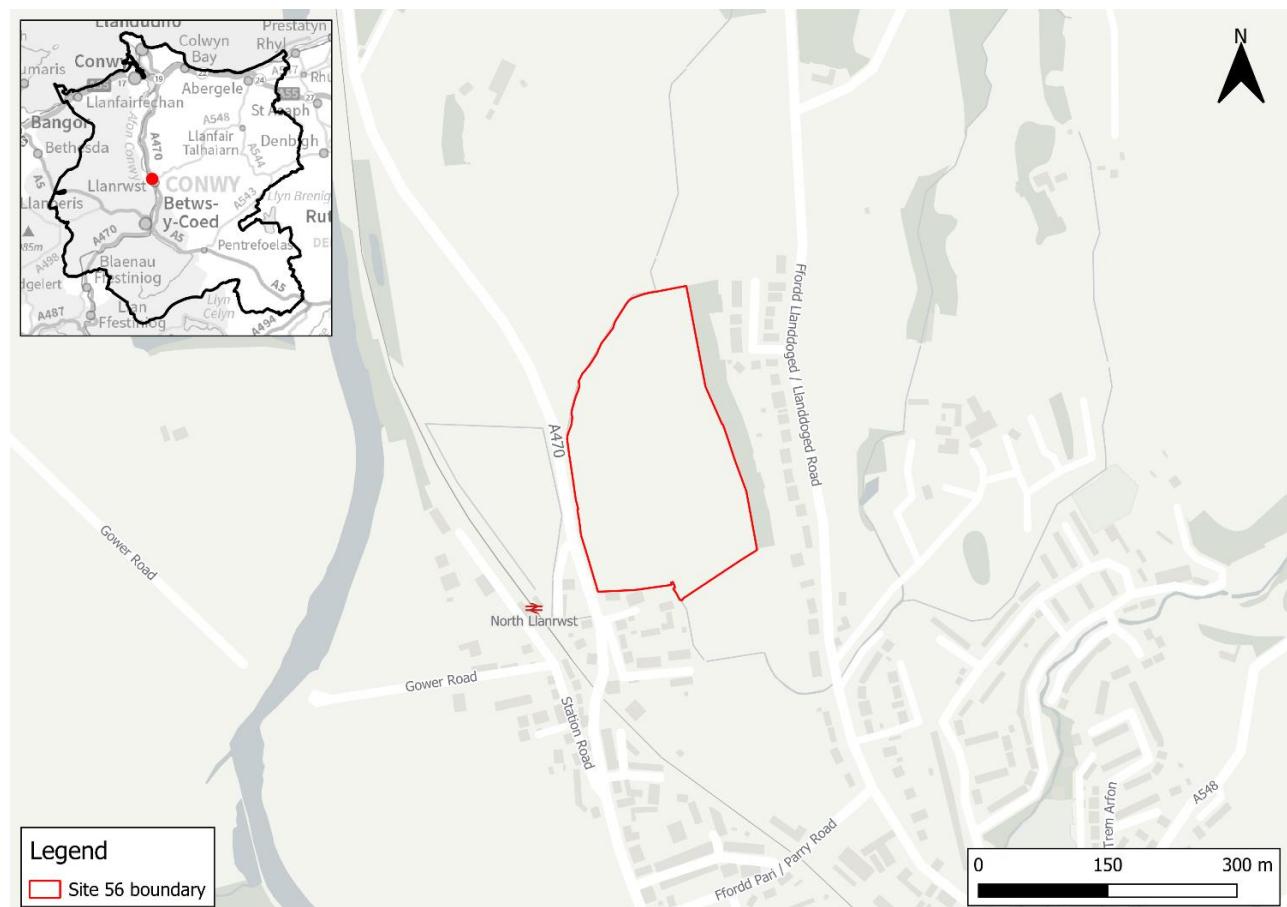


Figure 2-1 Site location

## 2.2 Development proposal

The proposed development of the site is highly vulnerable residential development, comprising approximately 100 dwellings.

## 2.3 Watercourses and flood defences

An unnamed, ordinary watercourse flows adjacent to the southern boundary of the site, flowing predominantly in a westerly direction. The closest main river to the site is the Afon Conwy, located approximately 200m to the west (Figure 2-2), to which the ordinary watercourse flow into.

There are no flood defences within the vicinity with the potential to influence flood risk to the site.

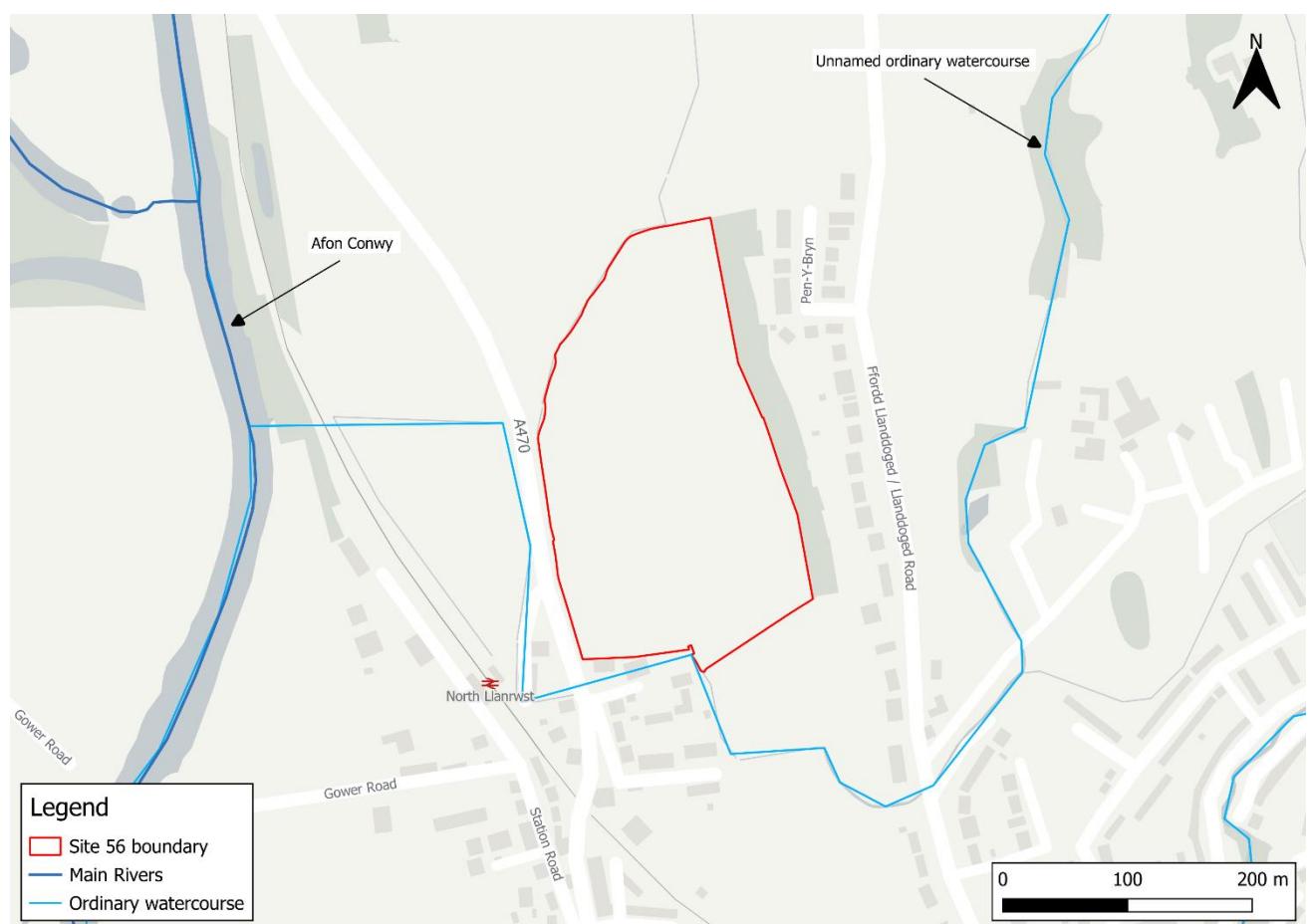


Figure 2-2 Watercourses

## 2.4 Site topography

The NRW Open Source 1m Light Detection and Ranging (LIDAR) data has been used to illustrate the site topography, as shown in Figure 2-3. Ground levels within Site 56 slope in a westerly direction towards the Afon Conwy floodplain in the west, with the highest ground level within the north of the site at approximately 27mAOD. The lowest ground levels are located towards the west of the site at approximately 8mAOD within the Afon Conwy floodplain.

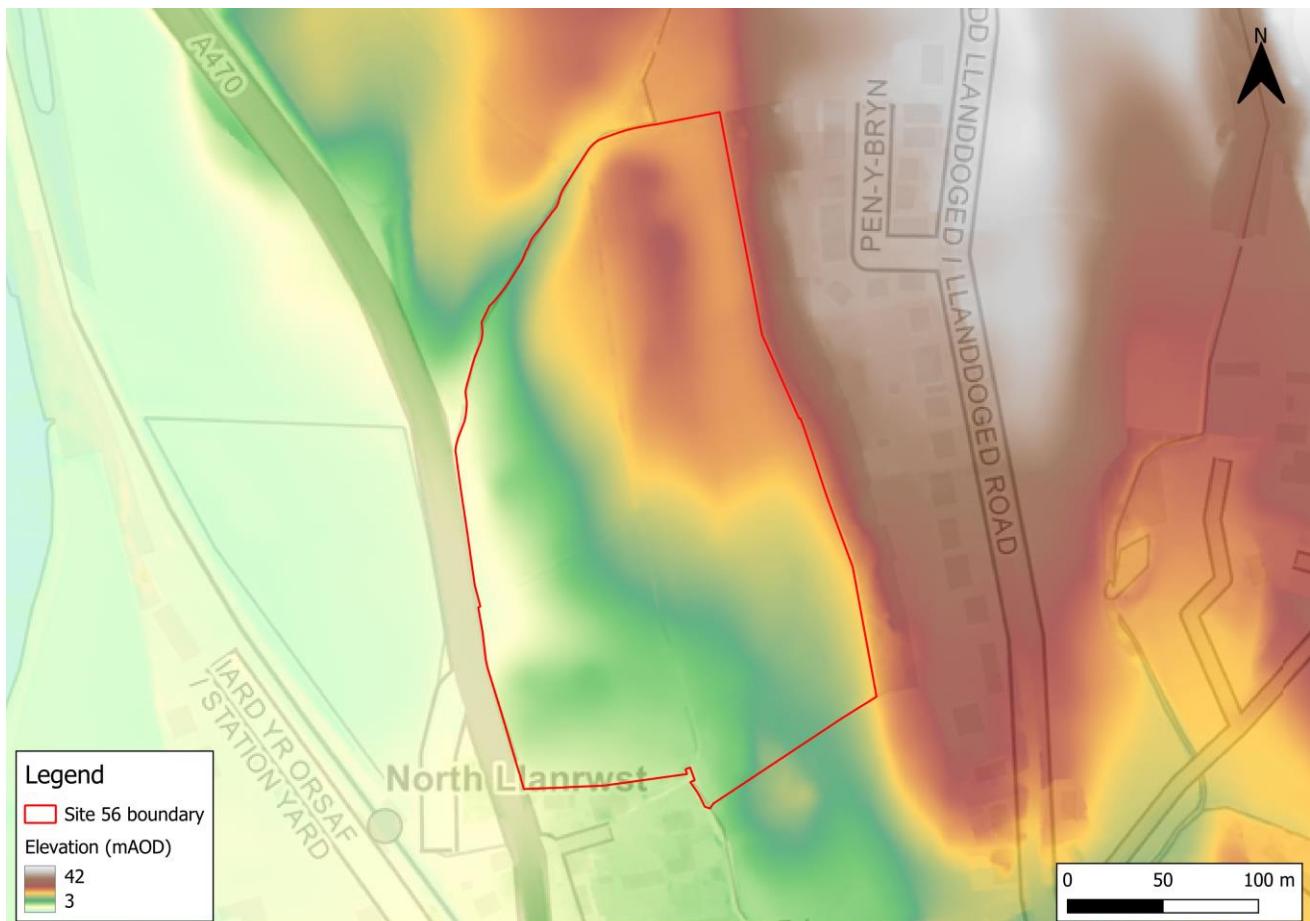


Figure 2-3 Site topography

### 3 Assessment of the site against Flood Risk Assessment Wales data

This chapter provides an assessment of flood risk to the proposed development site from all sources using the Flood Risk Assessment Wales (FRAW) data.

#### 3.1 Flood Risk from the Sea

Figure 3-1 shows the FRAW Flood Risk from the Sea mapping data. The mapping shows that the site is at **very low risk** of flooding from the sea.

Table 3-1 summarises the definition of each risk band.

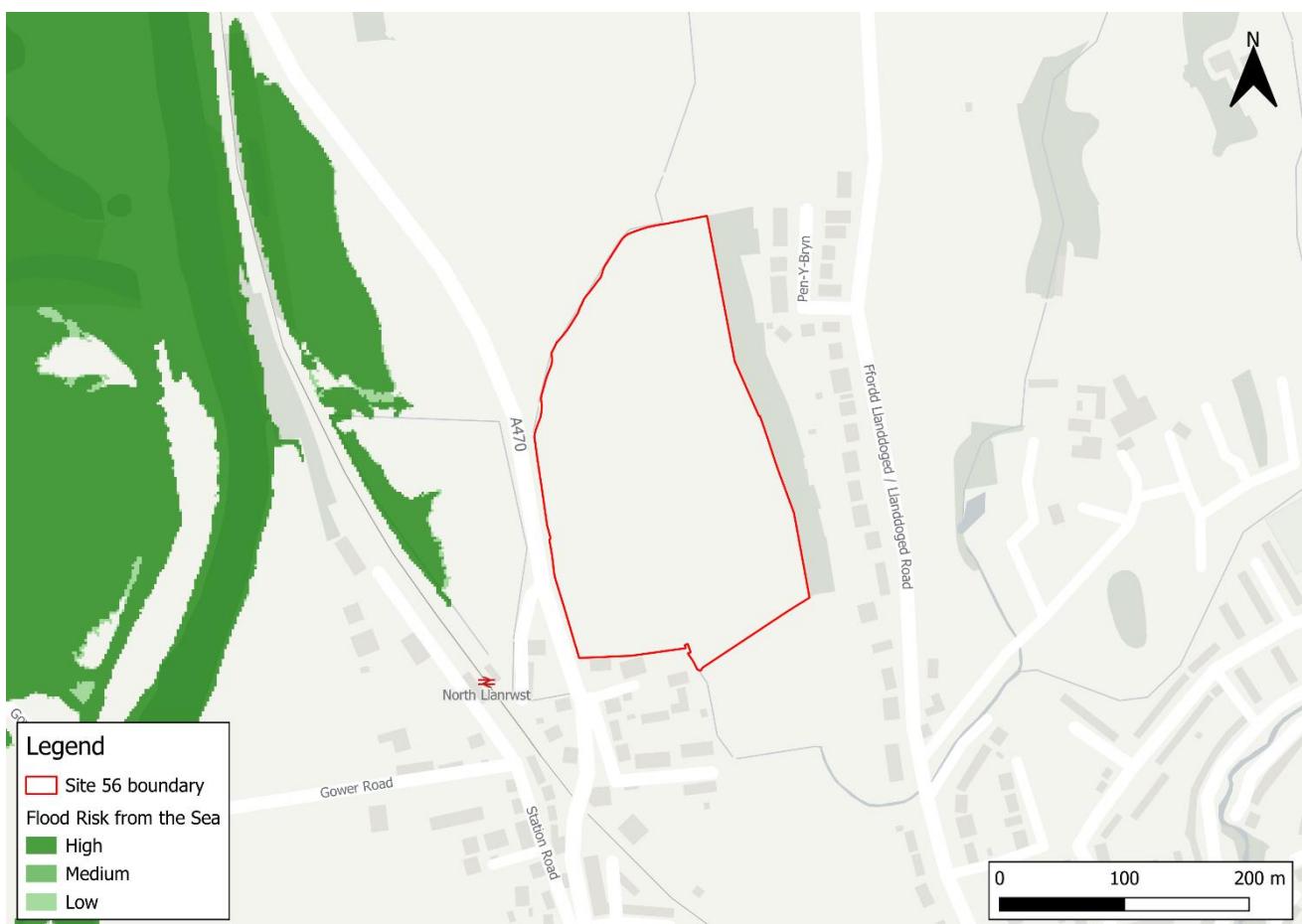


Figure 3-1 FRAW - Flood Risk from the Sea

Table 3-1 Flood Risk from the Sea risk band definitions

Risk Band	Definition
High	There is a greater than 3.3% AEP (1 in 30) chance of flooding from the sea in any given year.
Medium	There is a chance of flooding of between 0.5% AEP (1 in 200) and 3.3% AEP (1 in 30) in any given year.
Low	There is a chance of flooding of between 0.1% AEP (1 in 1000) and 0.5% AEP (1 in 200) in any given year.
Very Low	There is a less than 0.1% AEP (1 in 1000) chance of flooding from this source in any given year. However, the FRAW dataset ignores the influence of climate change induced sea levels.

### 3.2 Flood Risk from Rivers

Figure 3-2 shows the FRAW Flood Risk from Rivers mapping data. The mapping shows that the site is at **very low risk** of flooding from rivers.

Table 3-2 summarises the definition of each risk band.

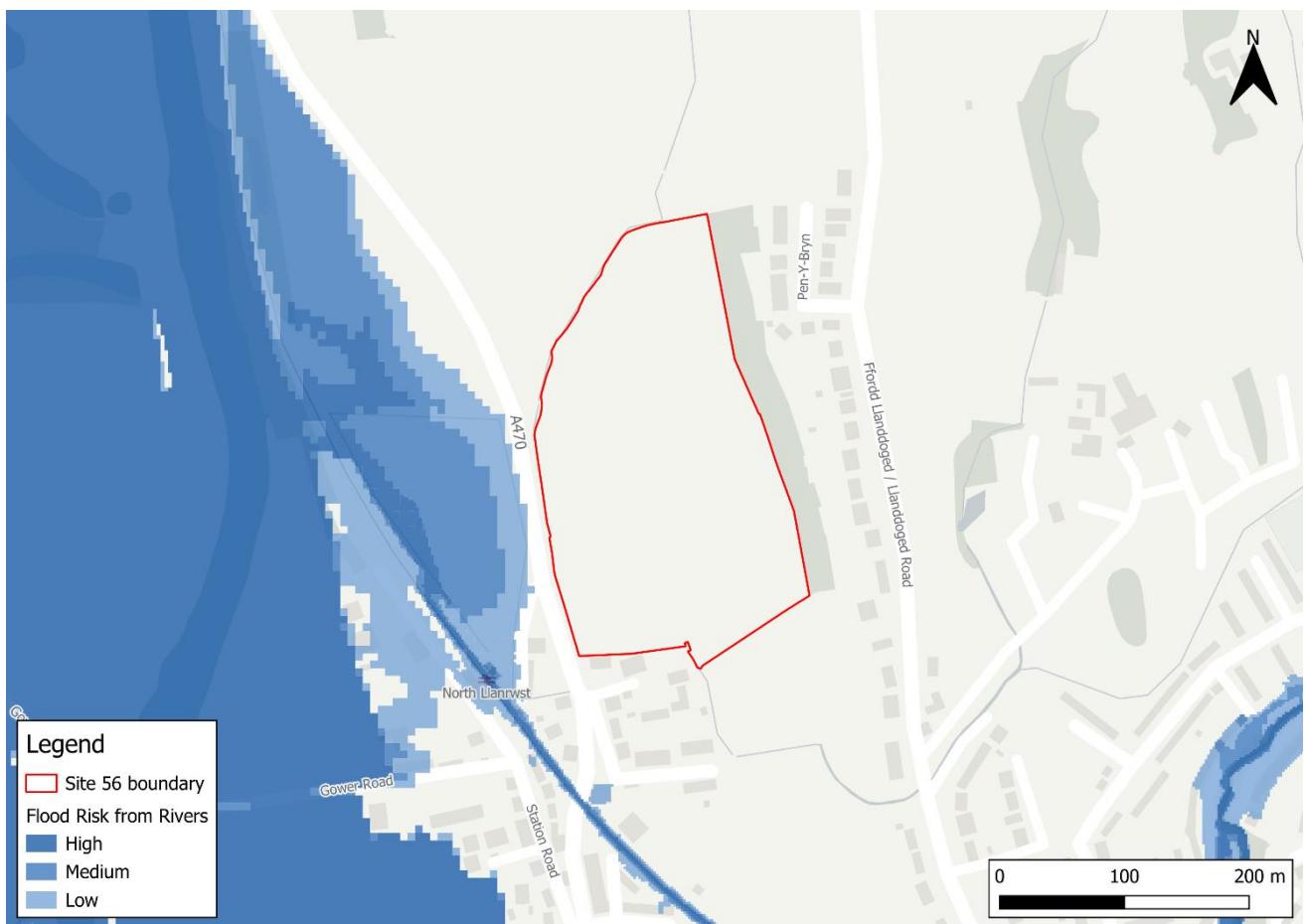


Figure 3-2 FRAW - Flood Risk from Rivers

Table 3-2 Flood Risk from Rivers risk band definitions

Risk Band	Definition
High	There is a greater than 3.3% AEP (1 in 30) chance of flooding from the sea in any given year.
Medium	There is a chance of flooding of between 1% AEP (1 in 100) and 3.3% AEP (1 in 30) in any given year.
Low	There is a chance of flooding of between 0.1% AEP (1 in 1000) and 0.5% AEP (1 in 200) in any given year.
Very Low	There is a less than 0.1% AEP (1 in 1000) chance of flooding from this source in any given year. However, the FRAW dataset ignores the influence of climate change induced sea levels.

### 3.3 Flood Risk from Surface Water and Small Watercourses

Figure 3-3 shows the FRAW Flood Risk from Surface Water and Small Watercourses mapping data. The mapping shows that the site is predominantly at **very low risk** of flooding from surface water and small watercourses. There is an area of high risk by way of a flow path along the northwestern boundary of the site, in addition to an area of ponding within the north of the site associated with a local topographic depression. The flow path appears to be an unmapped drain which flows across the A470 road (possible via a culvert though unconfirmed) and into the Afon Conwy. The presence of a culvert should be confirmed. This risk should be managed through considerate site design and SuDS. Table 3-3 summarises the definition of each risk band.

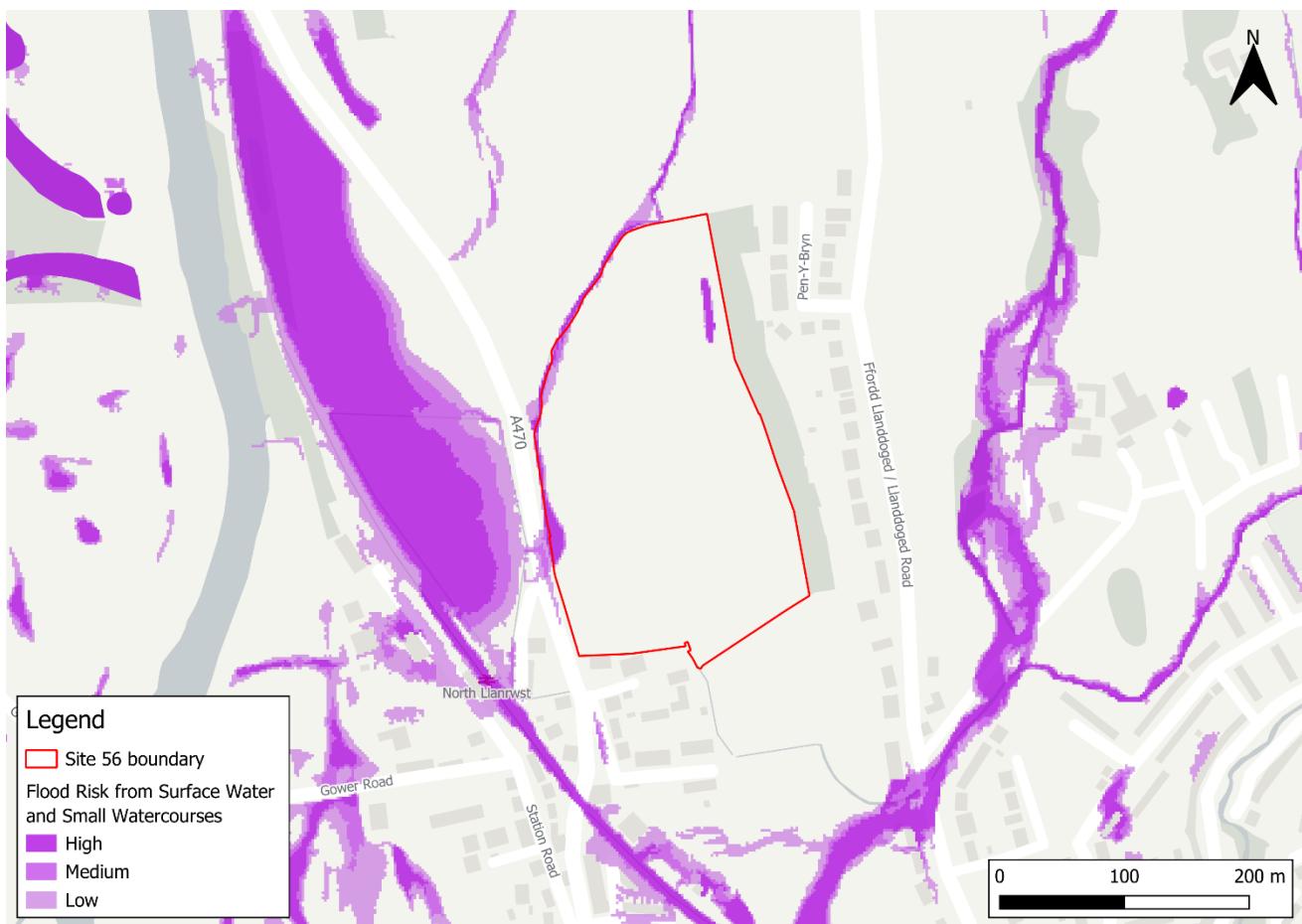


Figure 3-3 FRAW - Flood Risk from Surface Water and Small Watercourses

Table 3-3 Flood Risk from Surface Water and Small Watercourses risk band definitions

Risk Band	Definition
High	There is a greater than 3.3% AEP (1 in 30) chance of flooding from the sea in any given year.
Medium	There is a chance of flooding of between 1% AEP (1 in 100) and 3.3% AEP (1 in 30) in any given year.
Low	There is a chance of flooding of between 0.1% AEP (1 in 1000) and 0.5% AEP (1 in 200) in any given year.
Very Low	There is a less than 0.1% AEP (1 in 1000) chance of flooding from this source in any given year. However, the FRAW dataset ignores the influence of climate change induced sea levels.

### 3.4 Flood Risk from Reservoirs

Figure 3-4 shows the FRAW Flood Risk from Reservoirs mapping data. The mapping shows that the site is not modelled to be at risk from a reservoir breach. There is no risk level associated with reservoir flooding, rather a worst case scenario were a reservoir to fail.

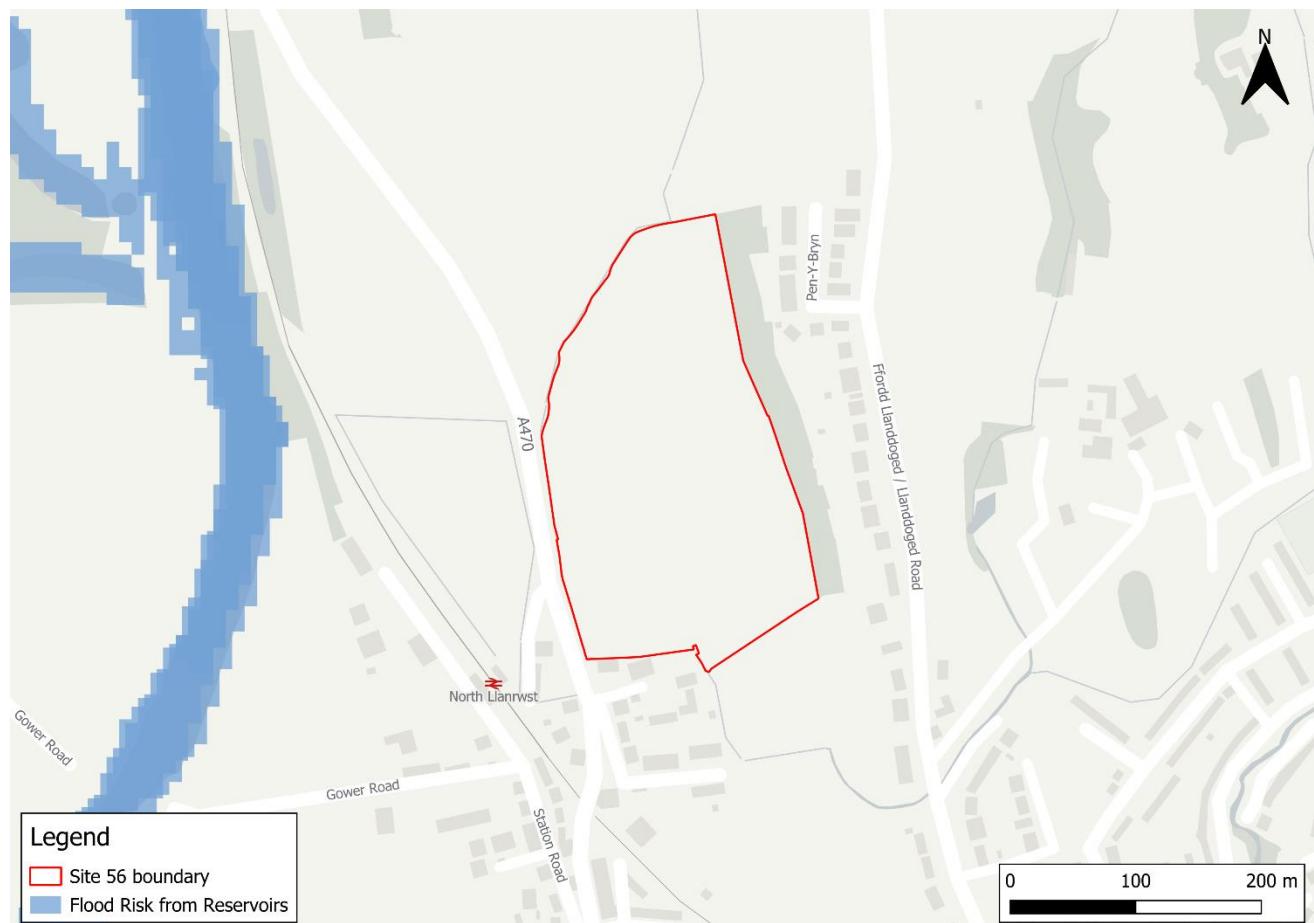


Figure 3-4 FRAW - Flood Risk from Reservoirs

### 3.5 Flood risk from groundwater (not in FRAW)

Groundwater flooding is caused by unusually high groundwater levels, and it occurs as excess water emerges at the ground surface or within manmade structures such as basements. Groundwater flooding tends to be more persistent than surface water flooding, sometimes lasting for weeks or months and can damage property. This risk of groundwater flooding depends on the nature of the site's geological strata and the local topography.

Flooding from groundwater sources is assessed in this Level 2 SFCA using JBA's 5m Groundwater Flood Map, as the FRAW does not include such a dataset. Figure 3-5 shows the map for Site 56 and the surrounding areas and Table 3-4 explains the risk classifications. The entirety of the site is in an area of no risk of groundwater emergence. Groundwater conditions may therefore be suited to infiltration SuDS.

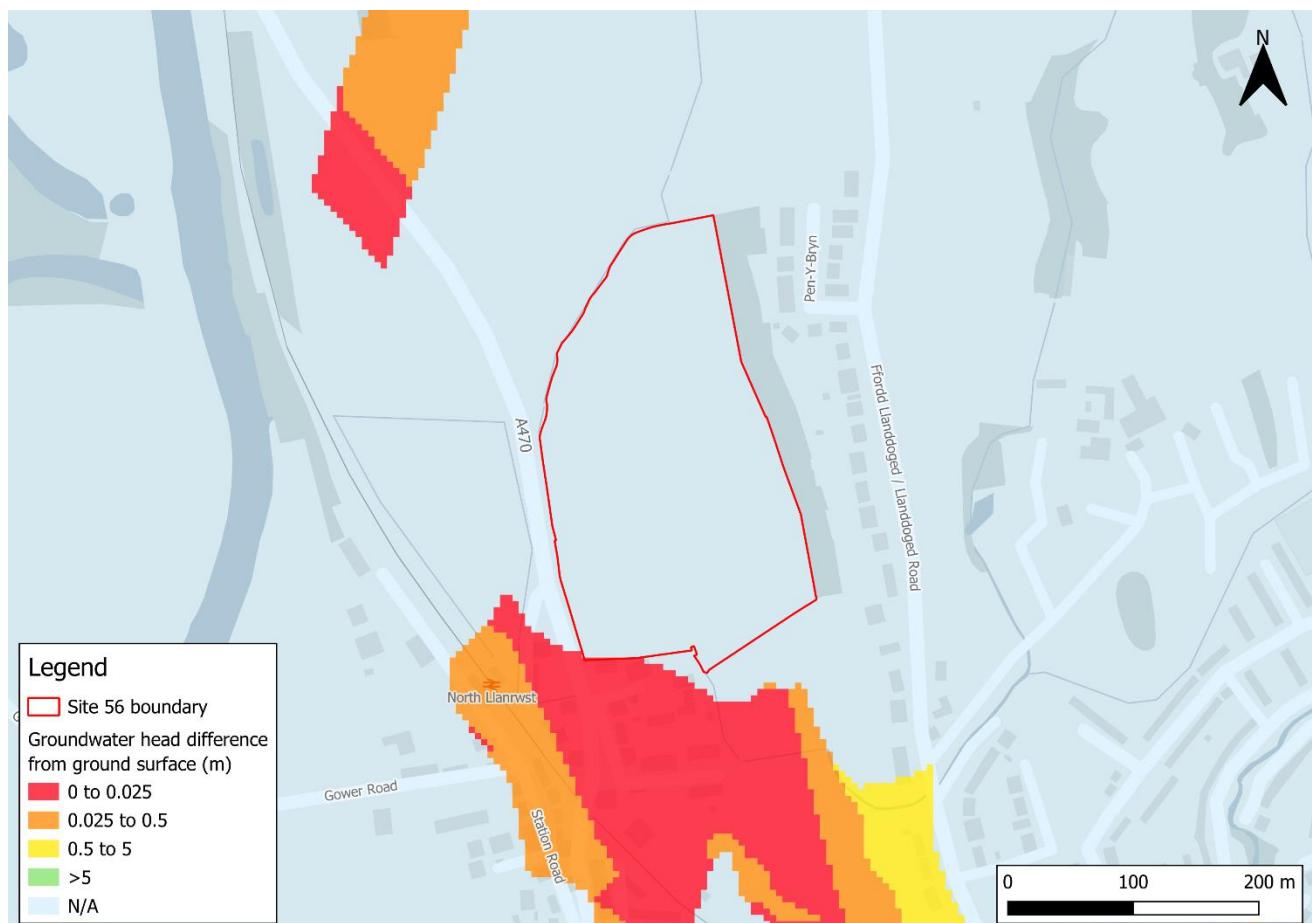


Figure 3-5 JBA 5m Groundwater Flood Map

Table 3-4 Groundwater Flood Hazard Classification

Groundwater head difference (m)*	Class label
0 to 0.025	Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater flooding to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
0.025 to 0.5	Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater flooding to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
0.5 to 5	Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event There is a risk of flooding to subsurface assets, but surface manifestation of groundwater is unlikely.
>5	Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event. Flooding from groundwater is not likely.
N/A	No risk. This zone is deemed as having a negligible risk from groundwater flooding due to the nature of the local geological deposits.

### 3.6 Summary of flood risk

Much of the site is at very low risk from flooding according to the FRAW, with the main source of flooding being from a surface water flow path along the northwestern boundary of the site and an isolated area of surface water flood risk within the north of the site.

However, if it can be proved through a Flood Consequence Assessment (FCA) that surface water risk can be managed, this should not impact the ability to develop this site.

## 4 TAN-15

This chapter provides a summarised overview of the requirements set out in TAN-15 (March 2025).

### 4.1 Flood Map for Planning

The initial requirement of TAN-15 is to identify the flood zones and vulnerability classification relevant to the allocation.

The Flood Map for Planning (FMfP) defines flood zones based on the central estimates of climate change, assuming a 100-year lifetime of the development. Table 4-1 summarises the flood zones and their definitions.

Table 4-1 TAN-15 Definition of the FMfP flood zones<sup>1</sup>

Zone	Flooding from Rivers	Flooding from the Sea	Flooding from Surface Water and Small Watercourses
1	Less than 1 in 1000 (0.1%) (plus climate change) chance of flooding in a given year.		
2	Less than 1 in 100 (1%) but greater than 1 in 1000 (0.1%) chance of flooding in a given year, including climate change.	Less than 1 in 200 (0.5%) but greater than 1 in 1000 (0.1%) chance of flooding in a given year, including climate change.	Less than 1 in 100 (1%) but greater than 1 in 1000 (0.1%) chance of flooding in a given year, including climate change.
3	A greater than 1 in 100 (1%) chance of flooding in a given year, including climate change.	A greater than 1 in 200 (0.5%) chance of flooding in a given year, including climate change.	A greater than 1 in 100 (1%) chance of flooding in a given year, including climate change.

<sup>1</sup> [Figure 1, TAN-15 | March 2025](#)

Zone	Flooding from Rivers	Flooding from the Sea	Flooding from Surface Water and Small Watercourses
TAN-15 Defended Zone	Areas where flood risk management infrastructure, managed and maintained by Risk Management Authorities, provides a minimum standard of protection against flooding from rivers of 1:100 (plus climate change and freeboard).	Areas where flood risk management infrastructure, managed and maintained by Risk Management Authorities, provides a minimum standard of protection against flooding from the sea of 1:200 (plus climate change and freeboard).	Not applicable.

#### 4.1.1 FMfP - Flood Risk from Rivers and the Sea

The Flood Map for Planning - Flood Risk from Rivers and the Sea indicates that the entirety of the site is within Flood Zone 1 (Figure 4-1). This represents a less than 0.1% AEP (1 in 1000-year) chance of flooding from fluvial or tidal mechanisms in any given year including the effects of climate change.

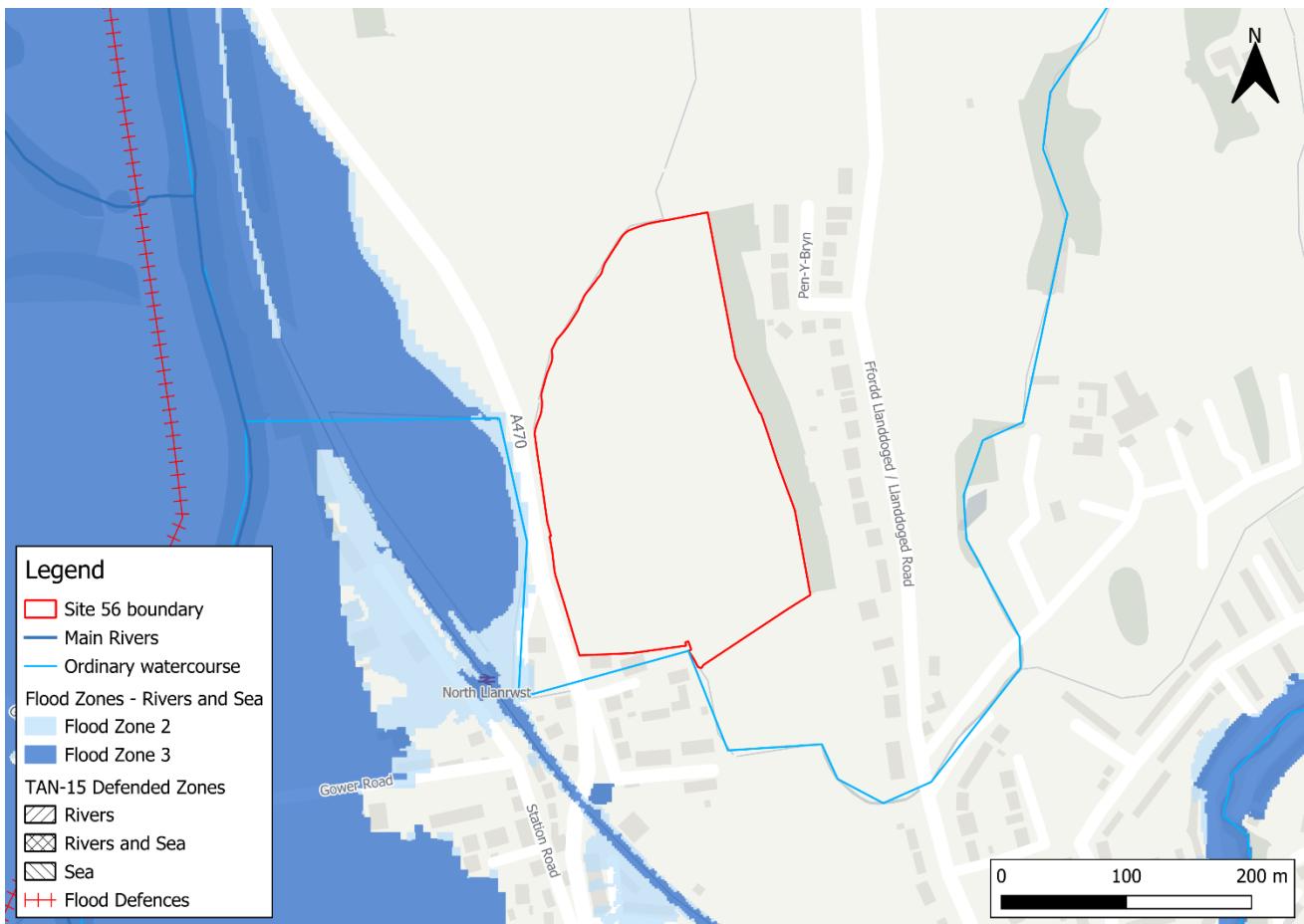


Figure 4-1 FMfP - Flood Risk from Rivers and the Sea

#### 4.1.2 FMfP - Flood Risk from Surface Water and Small Watercourses

The Flood Map for Planning - Flood Risk from Surface Water and Small Watercourses indicates that the site is predominantly located within Flood Zone 1 (Figure 4-2), meaning that most of the site has a less than 1 in 1000 (0.1%) (plus climate change) chance of flooding in a given year from surface water or small watercourses. The risk is very similar to that exhibited by the FRAW dataset.

There is a surface water flow path along the northwestern boundary of the site and also an isolated area of surface water flooding within the north of the site. The area of isolated flooding within the site is likely associated with a local topographic depression. These areas are both within Flood Zone 3.

As the site is partially located within Flood Zone 3 of the Flood Map for Planning for Surface Water and Small Watercourses, a detailed FCA would be required if development were to progress at this site, in accordance with TAN-15. This would need to demonstrate that the risk can be managed and mitigated appropriately. Given the nature of the risk within the site, local topographic depressions are likely to be addressed through the design and construction process through the use of appropriate SuDS techniques. Infiltration SuDS should be suitable on this site, based on the JBA Groundwater Flood Map.

Section 6.1 of TAN-15 advises planning authorities to ensure any new development adjacent to Flood Zones 2 and 3 for Surface Water and Small Watercourses is appropriately set back to allow for extreme flood events. SuDS features should be integrated from the outset, where appropriate. Therefore, it would be advisable to avoid the surface water flow path along the northwestern boundary of the site and include it within site design as a blue / green corridor.

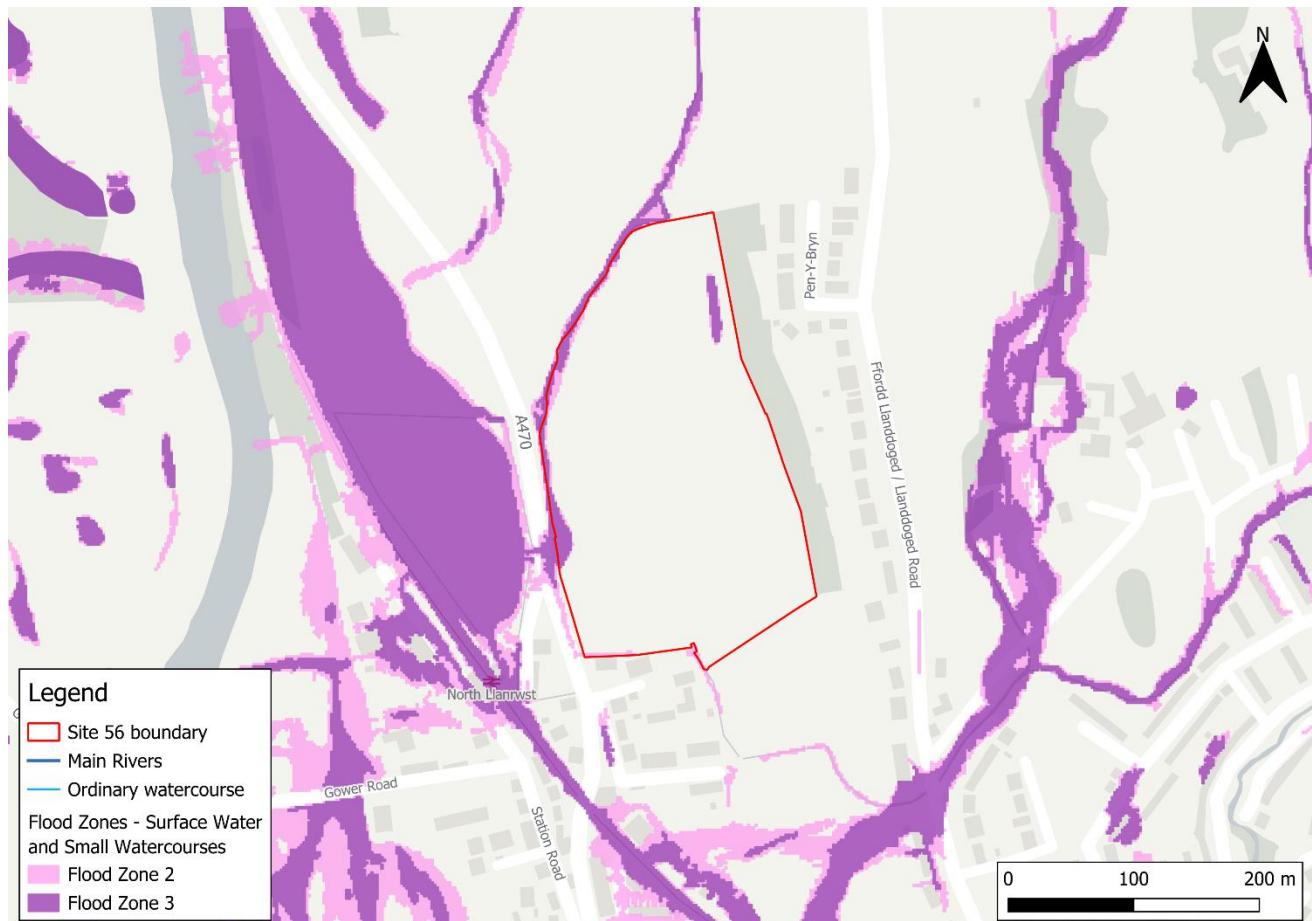


Figure 4-2 FMfP - Flood Risk from Surface Water and Small Watercourses

#### 4.2 Vulnerability to Flooding

Under TAN-15, one of the three flood risk vulnerability classifications can be assigned to a development, as shown in

Table 4-2 below. Site 56 has been proposed for residential development, with approximately 100 dwellings. Therefore, the site is classified as highly vulnerable development.

Table 4-2 Development vulnerability categories<sup>2</sup>

Development category	Types
Highly vulnerable development	<p>All residential premises (including hotels, Gypsy and Traveller sites, caravan parks and camping sites). Schools and childcare establishments, colleges and universities.</p> <p>Hospitals and GP surgeries.</p> <p>Especially vulnerable industrial development (e.g. power generating and distribution elements of power stations, transformers, chemical plants, incinerators), and waste disposal sites.</p> <p>Emergency services, including: ambulance stations, fire stations, police stations, command centres, and emergency depots.</p> <p>Buildings used to provide emergency shelter in times of flood.</p>
Less vulnerable development	<p>General industrial, employment, commercial and retail development.</p> <p>Transport and utilities infrastructure.</p> <p>Car parks.</p> <p>Mineral extraction sites and associated processing facilities (excluding waste disposal sites).</p> <p>Public buildings including libraries, community centres and leisure centres (excluding those identified as in Highly Vulnerable category and emergency shelters).</p> <p>Places of worship.</p> <p>Cemeteries.</p> <p>Equipped play areas.</p> <p>Renewable energy generation facilities (excluding hydro generation).</p>
Water compatible development	<p>Boatyards, marinas and essential works required at mooring basins.</p> <p>Development associated with canals.</p> <p>Flood defences and management infrastructure.</p> <p>Open spaces (excluding equipped play areas).</p> <p>Hydro renewable energy generation.</p>

2 [Figure 4, TAN-15 | March 2025](#)

#### 4.3 New Development and Redevelopment

TAN-15 provides advice around four different types of development. This recognises that the ability to avoid or minimise risk when undertaking development varies according to the type of development proposed. These new definitions have been introduced to include an element of flexibility for appropriate regeneration and redevelopment proposals within flood-risk areas. The four different definitions of development are:

- New development,
- Redevelopment,
- Change of use or conversions, and
- Extensions.

Proposed development within Site 56 is most closely aligned with the definition of new development. TAN-15 defines new development as "*any development on greenfield land*". (TAN-15, para 8.3).

At the time of writing, the proposed site will be classified as a new development within TAN-15.

#### 4.4 Acceptability of flood consequences

As indicated within Section 4.1, the proposed development is located within Flood Zone 1 of the Flood Map for Planning - Flood Risk from Rivers and the Sea. TAN-15 states that all types of development are acceptable in principle within Flood Zone 1. Planning authorities should develop locally specific planning policies for localised areas at risk of flooding.

Consequently, an FCA is not required to address fluvial or tidal flood risk. However, as the site is within Flood Zone 3 of the Flood Map for Planning - Flood Risk from Surface Water and Small Watercourses, an FCA would be required to address flood risk from these sources. The FCA will likely be simple due to the nature of the risk at this site. The FCA should include details on how the surface water risk will be managed, including the use of appropriate SuDS.

Surface water and ordinary watercourse flood risk management are the responsibility of the Lead Local Flood Authority (LLFA), which may have specific requirements for surface water management, including for greenfield runoff rates and site-specific SuDS design. The FCA should develop a full appreciation of:

- The risk and consequences of flooding on the development,
- The risk and consequences of the development on flood risk elsewhere,
- How surface water flood risk will be managed appropriately through the use of SuDS techniques and a robust surface water drainage strategy, and
- How existing flow routes and watercourse will be retained in the proposed site layout.

## 5 Conclusion

### Site Description

- JBA Consulting has been commissioned to prepare a Stage 2 SFCA in support of a RLDP allocation at Land to the East of the A470, Llanrwst for residential use.
- The site is located in Llanrwst, Conwy and is currently undeveloped agricultural land.

### Overview of flood risk

- The primary risk of flooding to the site is from surface water and small watercourses. The flow path along the northwestern boundary of the site will need to be retained as open channel in any future development, with any built development being directed away from this area.
- The site is at very low risk of flooding from fluvial, tidal and groundwater flooding.
- The site is not modelled to be at risk of flooding from reservoirs.

### TAN-15 (March 2025)

- TAN-15 appears to suggest that the proposed residential development would be justified and appropriate at this site.
- The site is located within Flood Zone 1 for Rivers and the Sea.
- An FCA will be required for the site in line with TAN-15 guidance, as the site is partially within Flood Zone 3 for Surface Water and Small Watercourses. The FCA will need to demonstrate that the surface water and small watercourse flood risk at the site is managed through the use of SuDS.

### Conclusion

- It is concluded that on the grounds of flood risk, the development proposal complies with the aims and objectives of TAN-15 and Planning Policy Wales.

## 6    Licencing

To cover all figures in this report:

- Contains Natural Resources Wales information © Natural Resources Wales and/or database right [2025]
- Contains Ordnance Survey data © Crown copyright and database right [2025]
- CCBC Ordnance Survey licence number: 100023380 [2025]

**Offices at**

Bristol  
Coleshill  
Doncaster  
Dublin  
Edinburgh  
Exeter  
Glasgow  
Haywards Heath  
Isle of Man  
Leeds  
Limerick  
Newcastle upon Tyne  
Newport  
Peterborough  
Portsmouth  
Saltaire  
Skipton  
Tadcaster  
Thirsk  
Wallingford  
Warrington

Registered Office  
1 Broughton Park  
Old Lane North  
Broughton  
**SKIPTON**  
North Yorkshire  
BD23 3FD  
United Kingdom

+44(0)1756 799919  
[info@jbaconsulting.com](mailto:info@jbaconsulting.com)  
[www.jbaconsulting.com](http://www.jbaconsulting.com)  
Follow us:  

Jeremy Benn  
Associates Limited  
Registered in England  
3246693

JBA Group Ltd is  
certified to:  
ISO 9001:2015  
ISO 14001:2015  
ISO 27001:2013  
ISO 45001:2018

