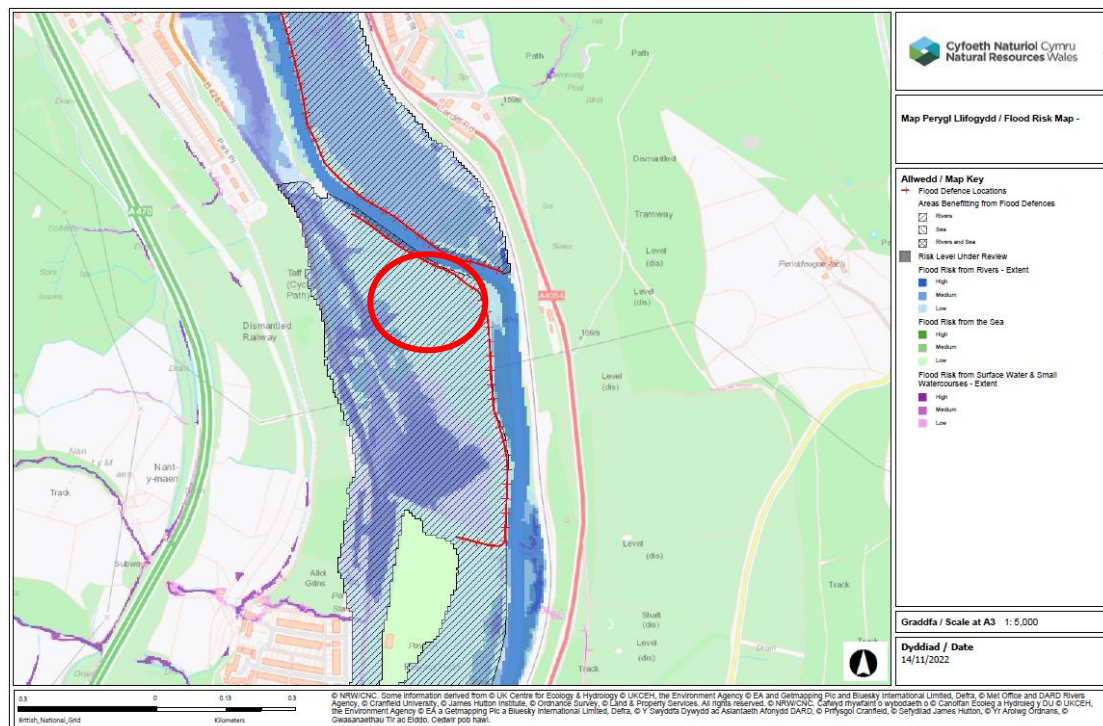


Francis Sant

Static Caravan Pitch and Day Room, Near Ynysgored Cottages, Aberfan Flood Consequence Assessment Report

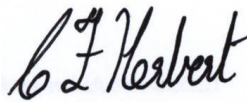


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Final
Revision B

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This document has been produced in accordance with Francis Sant Limited Quality Management System

Signed



Date

March 2023

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1 INTRODUCTION

It is proposed to develop a static caravan pitch and day room on land near Ynysgored Cottages, Aberfan. The site lies in a **C1** flood zone, as defined by the development advice maps (see Figure 1.1) referred to in Technical Advice Note 15 (Development and Flood Risk - TAN 15). This means that the development could be at risk of flooding during at least the 1 in 1000 year event but is afforded protection from significant and recognised flood defences.

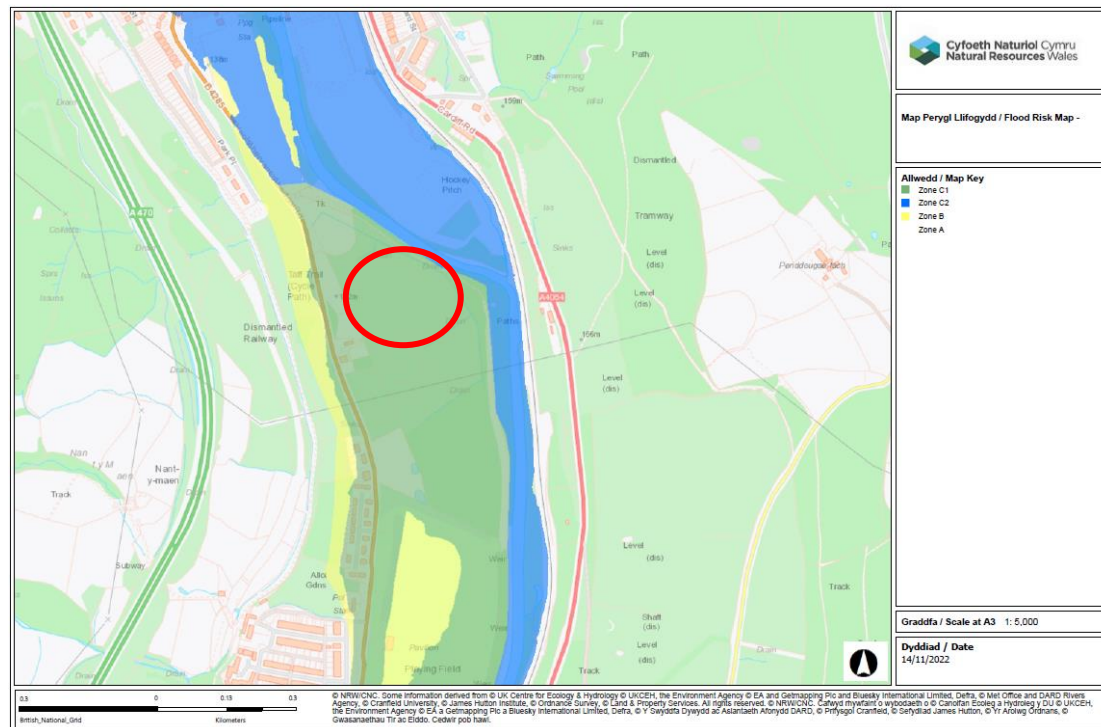


Figure 1.1 - Development Advice Flood Map

The Development Advice Maps are based on Natural Resources Wales Flood Risk Maps (see Figure 1.2) supplemented by sediment data, held by the British Geological Survey (BGS), of historical flooding. The maps adopt the precautionary principle and are based on the best known information available at the time. However, a detailed examination of a site can refine an area's risk of flooding.

Considering the proximity of the site to the Afon Taf it is possible that the area could be at risk from fluvial flooding, particularly when taking climate change into consideration. As such the client has requested that a Flood Consequence Assessment be prepared to evaluate the risk. The assessment should be in accordance with the requirements of Section 7 and Appendix 1 of TAN 15. Francis Sant have been employed to undertake this task.

This document summarises the work undertaken as part of the study. Section 2 of the report gives a description of the surrounding area while the risk of flooding from various sources is considered in Section 3. Possible flood proofing measures are discussed in Section 4 and the conclusions and recommendations of the study are provided in Section 5.

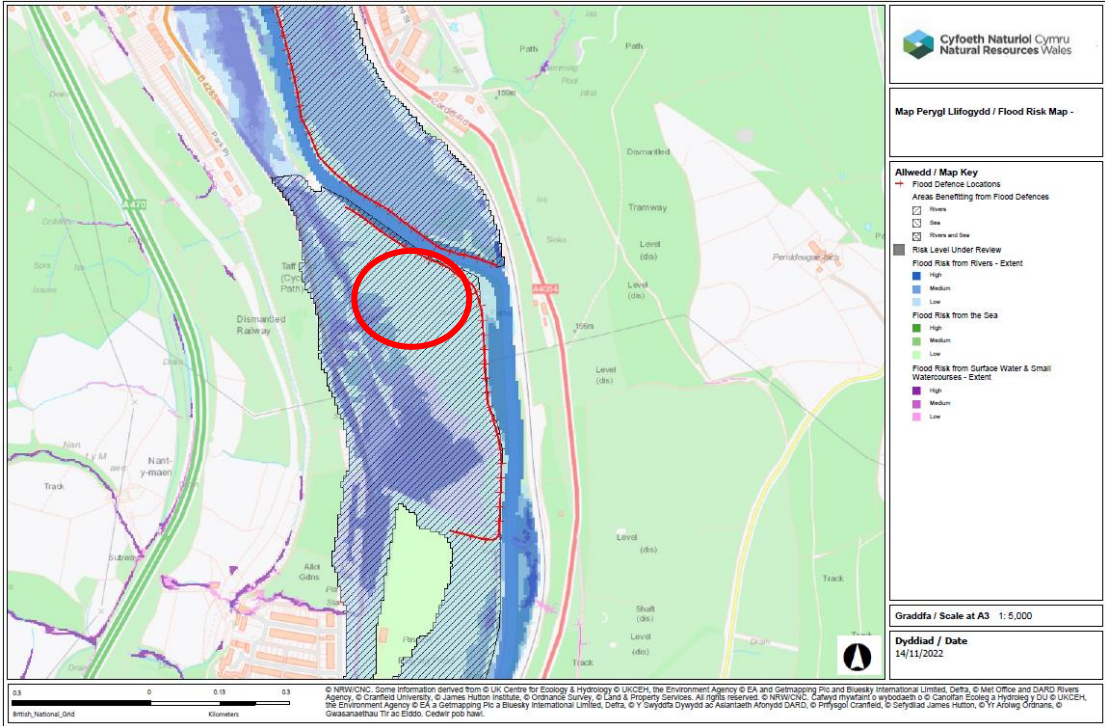


Figure 1.2 – NRW Flood Risk Assessment Map

2 DEVELOPMENT

The development (coordinates 307300 201450) is located north of Aberfan, some 4km south east of Merthyr Tudfil and some 25km north west of Cardiff (see Figure 2.1 to 2.3 and Plate 2.1). Afon Taf is some 100m north east and 200m to the east while the B4285, Aberfan Road, is some 125m to the west and the A470 dual carriageway is some 350m in the same direction.

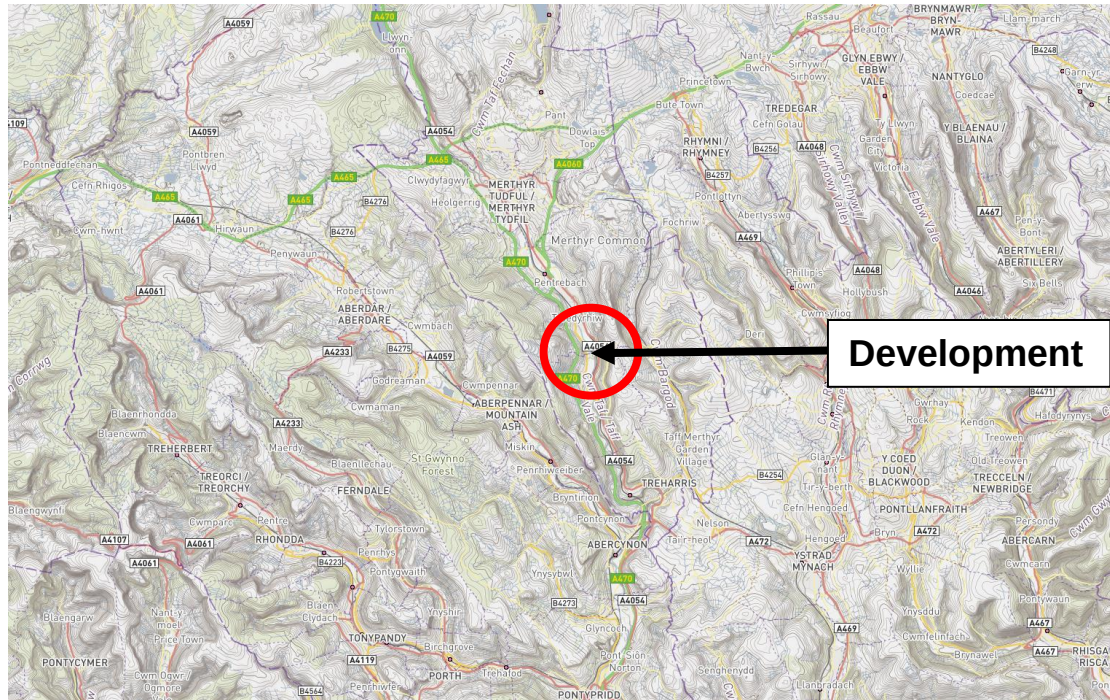


Figure 2.1 – Location Plan

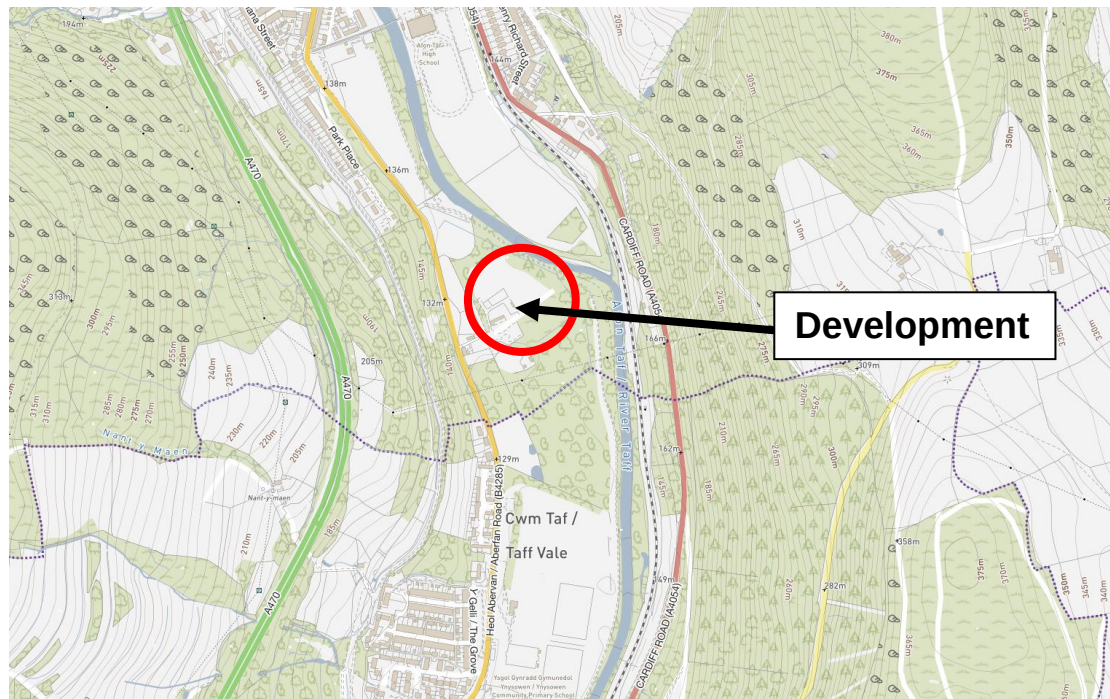


Figure 2.2 – Plan of Area



Figure 2.3 – Plan of Site

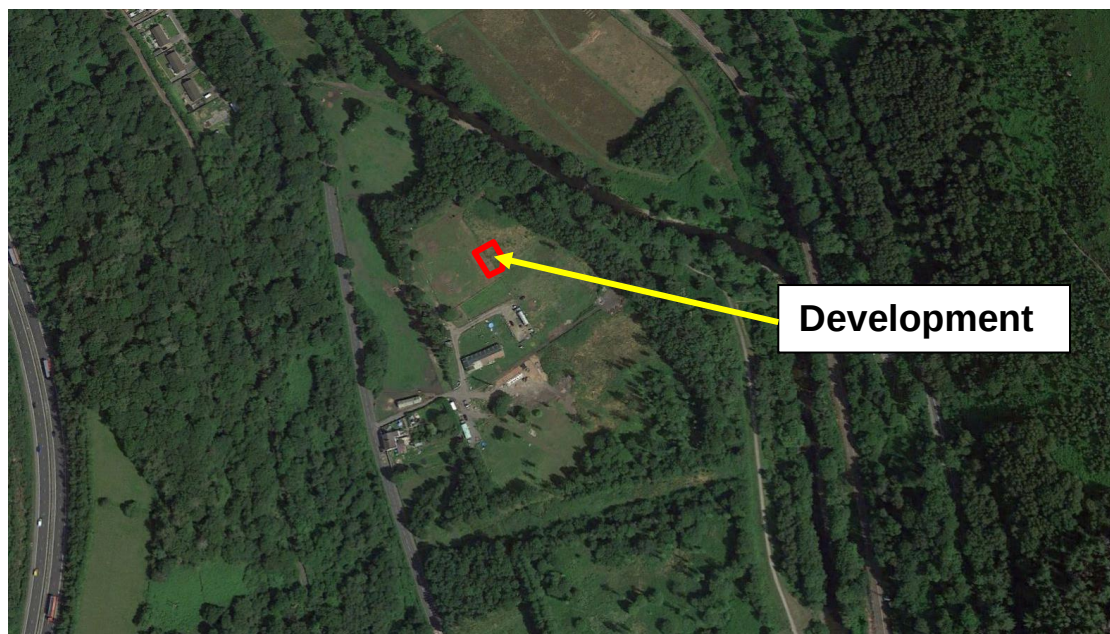


Plate 2.1 – Aerial View of Site

Proposed Development

The proposals consist of a single static caravan pitch, a touring caravan pitch and a day room, located in an open area (see Figure 2.4 to 2.7).



Figure 2.5 – Block Plan of Proposed Development

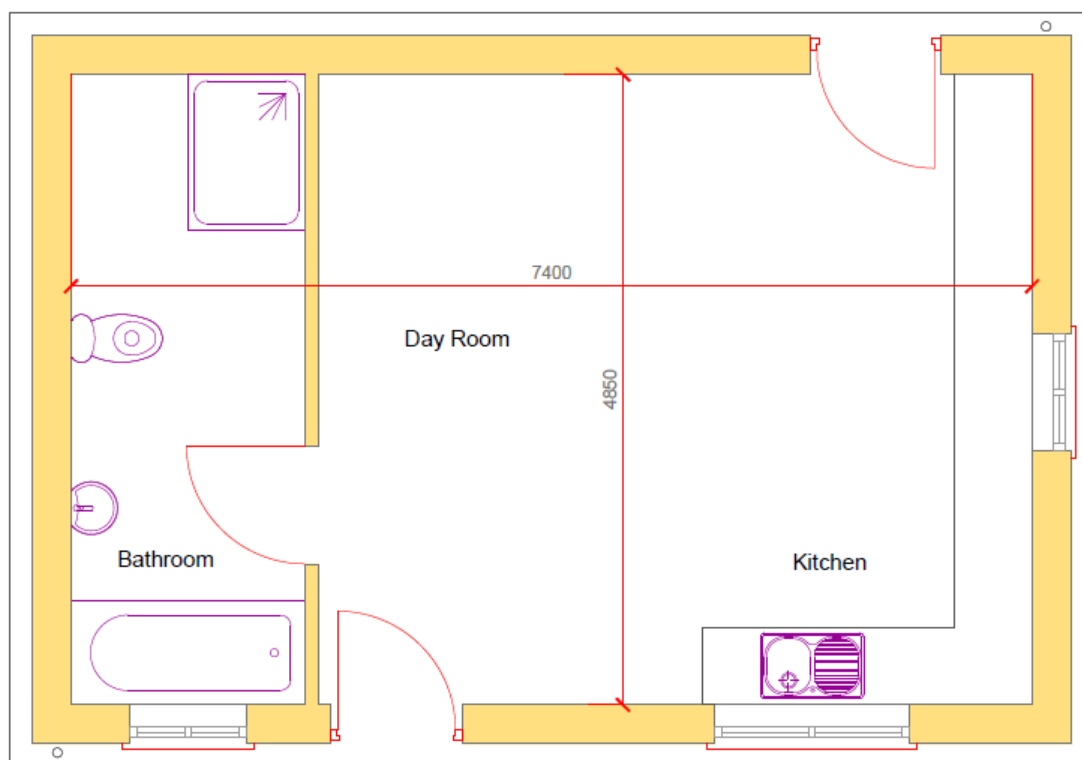


Figure 2.6 – Plan of Proposed Day Room

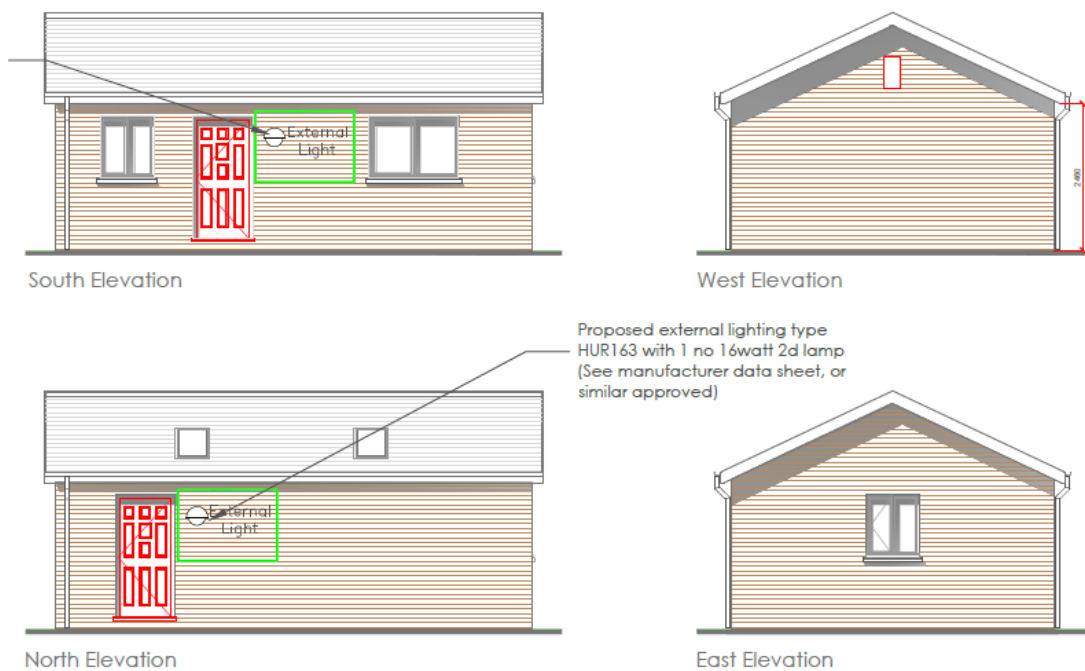


Figure 2.7 – Elevations of Proposed Day Room

Topography

Lidar data (see Figure 2.8) shows that the development land is set at around 133.6m AOD with the terrain falling from north east to south west.

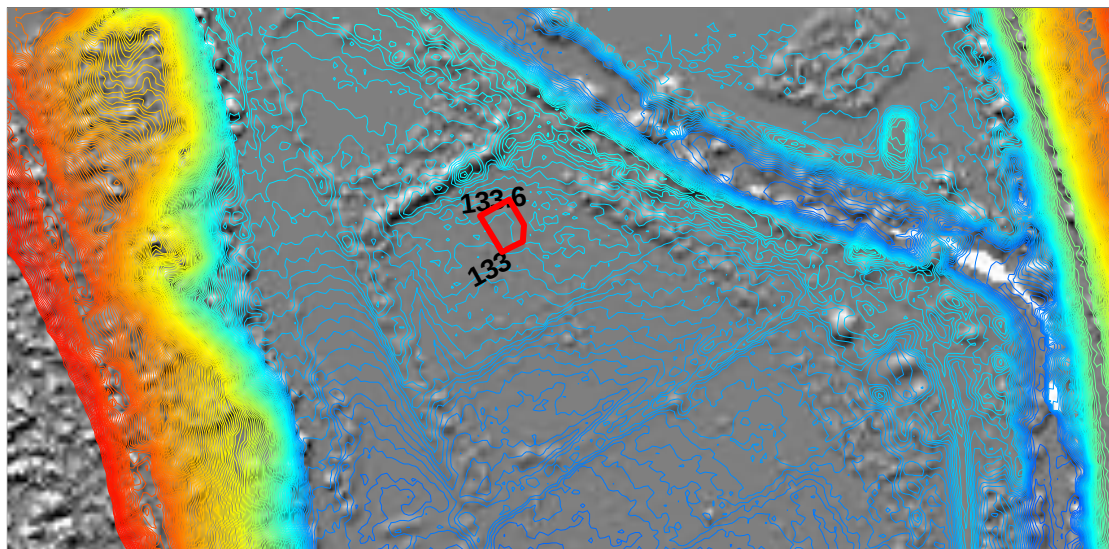


Figure 2.8 – Lidar Data for the Site

3 FLOOD RISK

Flooding can occur from several sources, some of which are considered in this section. The Flood Risk Assessment map (see Figure 3.1), produced by Natural Resources Wales, indicates that, without defences, the site could be at risk during a Q1000 fluvial event but is expected to be flood free during a Q100 event. However, the site is afforded protection against flooding from significant defences. The map does not take climate change into consideration.

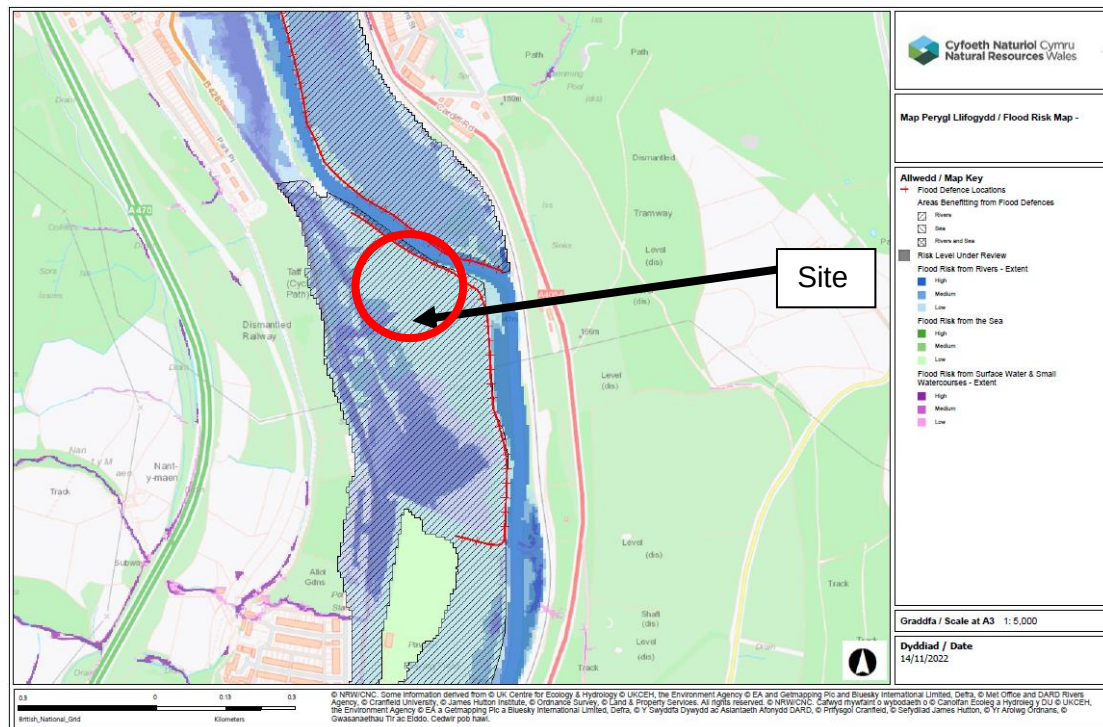


Figure 3.1- NRW Flood Risk Assessment Map

3.1 Fluvial

NRW's Flood Map For Planning, which allows for climate change, shows that the development could be at risk from fluvial flooding during both the Q100 and the Q1000 events (see Figure 3.2). The hazard Maps suggest that the flood hazard is low (see Figures 3.3).

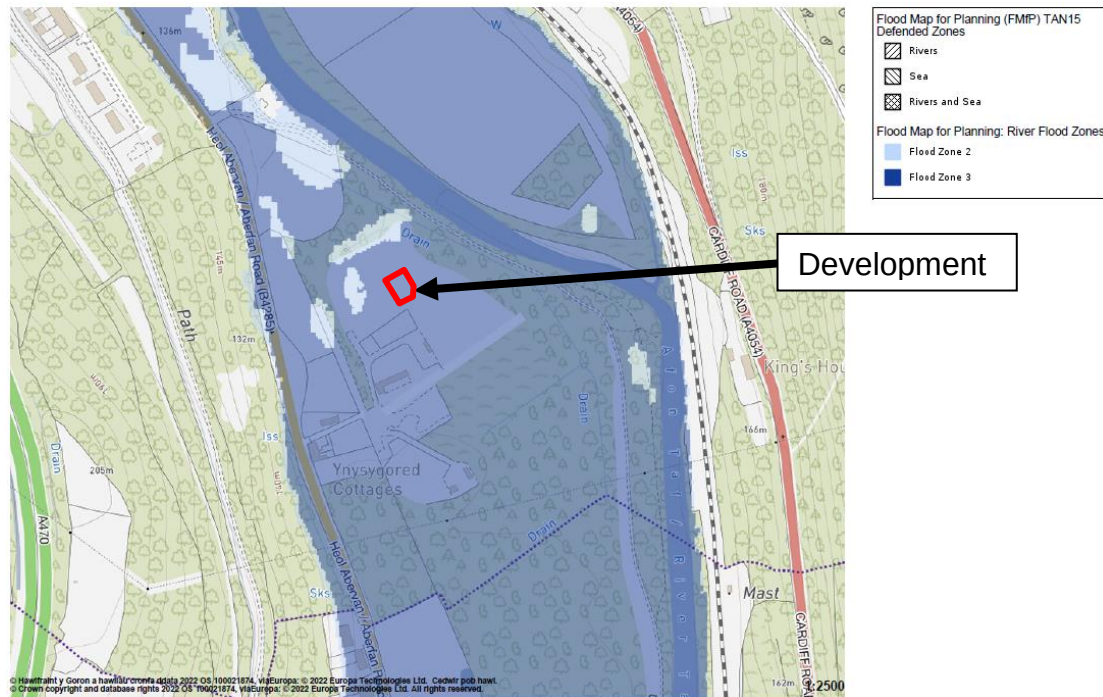


Figure 3.2 – River Flood Map For Planning

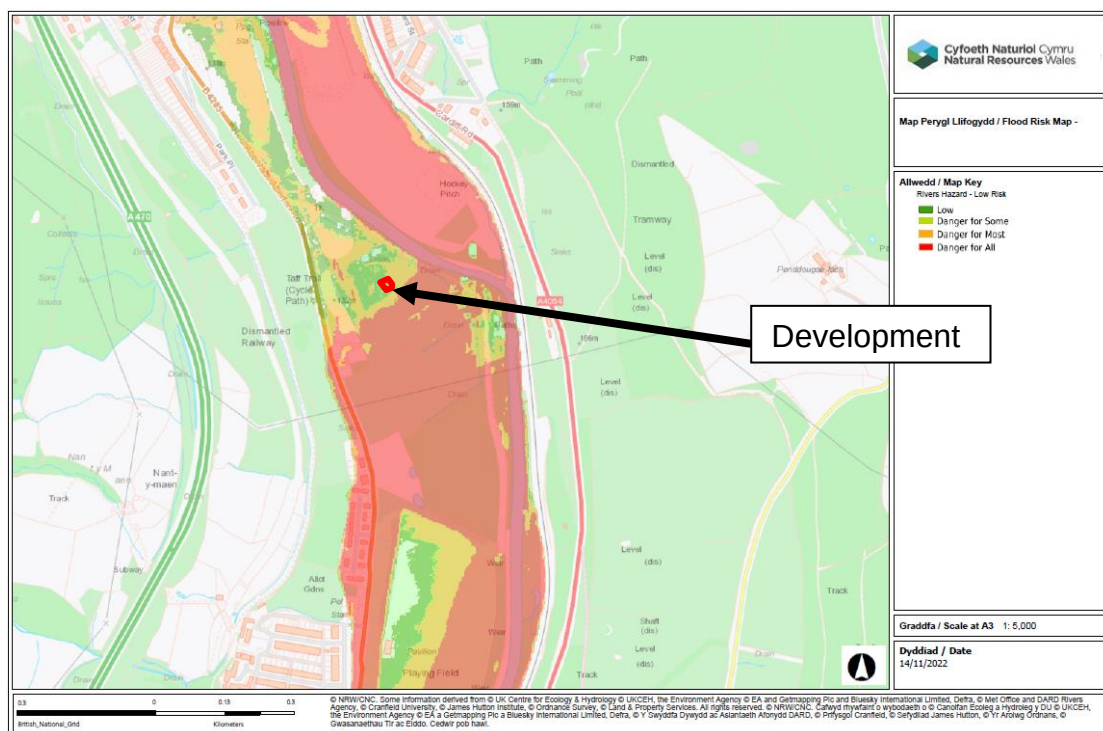


Figure 3.3 - Q1000 Hazard Map Risk

The results from the latest NRW 2D TUFLOW model suggests that the development area is expected to be flood free during the Q100 event, even when taking climate change into consideration (see Figure 3.4, 3.5 3.7. 3.8 and Table 3.1). During the Q1000 event the flood depth at the site expected to be less than 100mm with a corresponding velocity of less 0.15m/s (see Figure 3.6, 3.9 and Table 3.1).

These values assume that the defences for the area are in place. Should the defences fail, or be removed, the site is expected to remain flood free during the Q100 event and the flood depth will be less than 200mm and generally less than 100mm during the Q1000 event (see Figure 3.10, 3.12 and Table 3.1). The flow velocity during the Q1000 event is expected to be less than 0.6m/s (see Figure 3.13 and Table 3.1).

Table 3.1 Velocity and Depth Key			
Region	Depth	Region	Velocity
	0-0.1m		0 - 0.15m/s
	0.1m-0.2m		0.15m/s - 0.3m/s
	0.2m-0.3m		0.3m/s - 0.45m/s
	0.3m-0.6m		0.45m/s - 0.6m/s
	0.6m-1m		0.6m/s - 1m/s
	1m-2m		1m/s - 2m/s
	2m-3m		2m/s - 3m/s
	>3m		> 3m/s

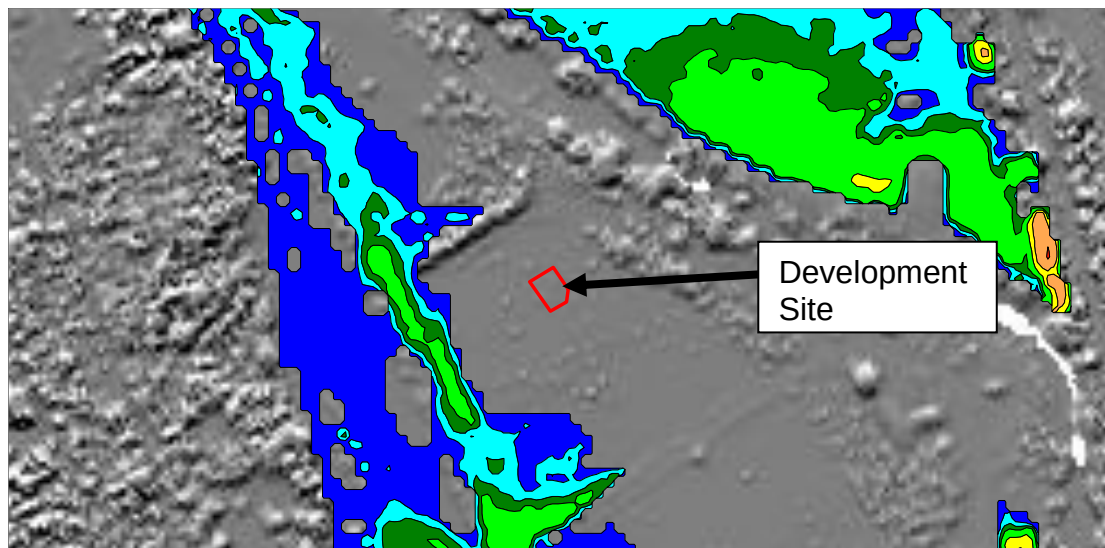


Figure 3.4 - Q100 Depth (Key on Table 3.1)

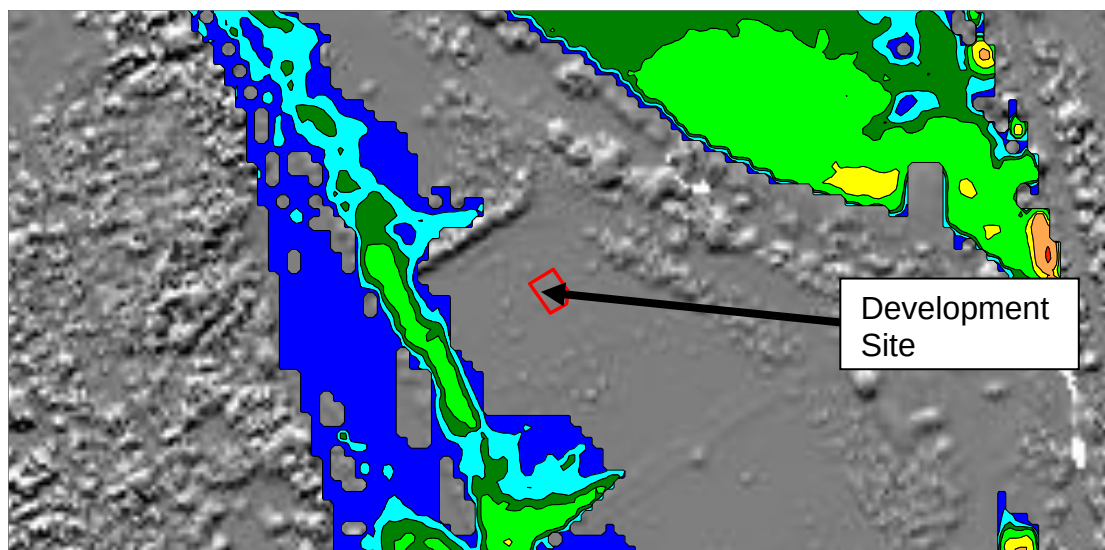


Figure 3.5 - Q100 With Climate Change - Depth (Key on Table 3.1)

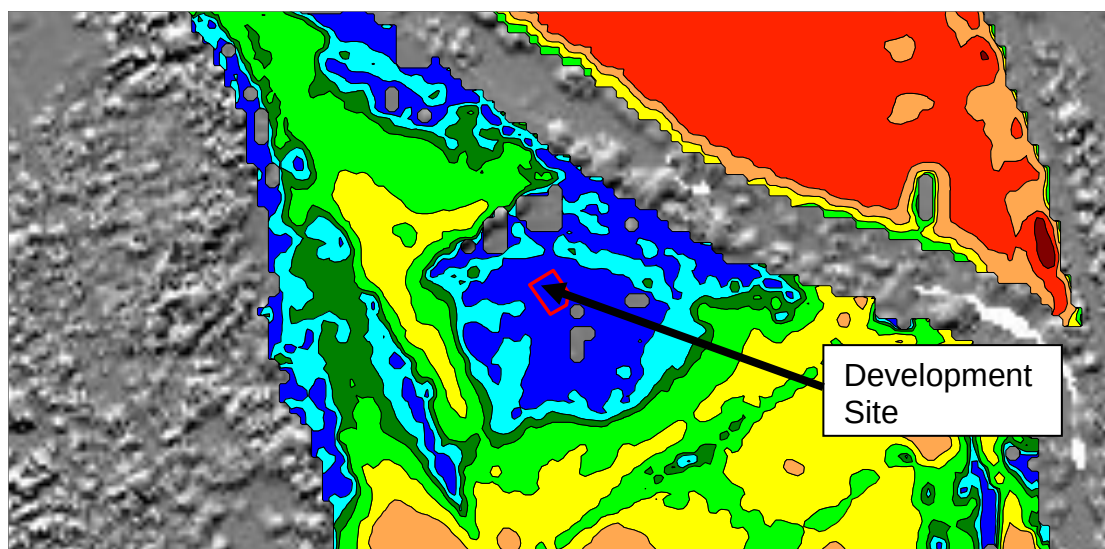


Figure 3.6 - Q1000 Depth (Key on Table 3.1)

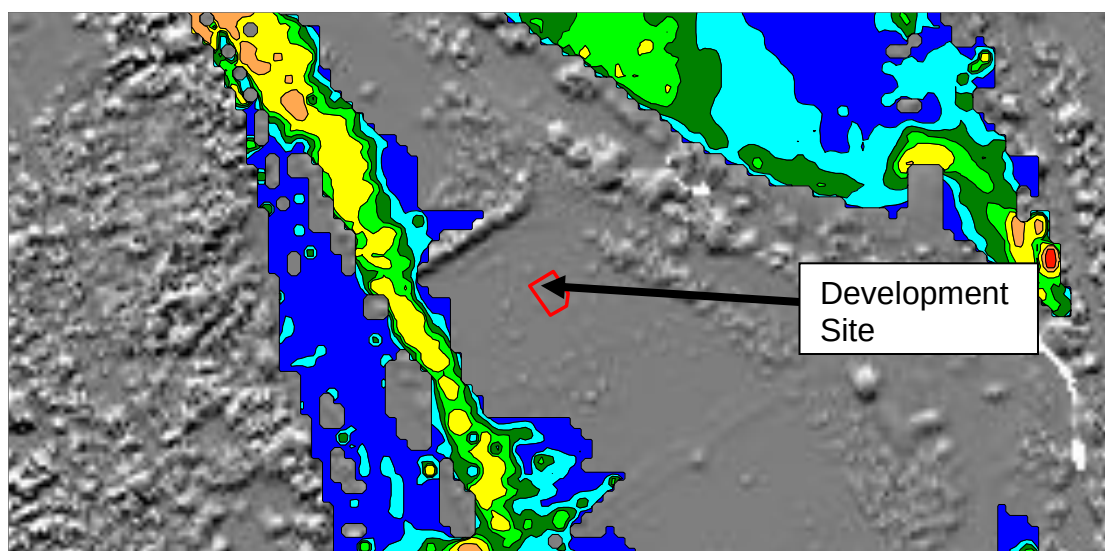


Figure 3.7 - Q100 Velocity (Key on Table 3.1)

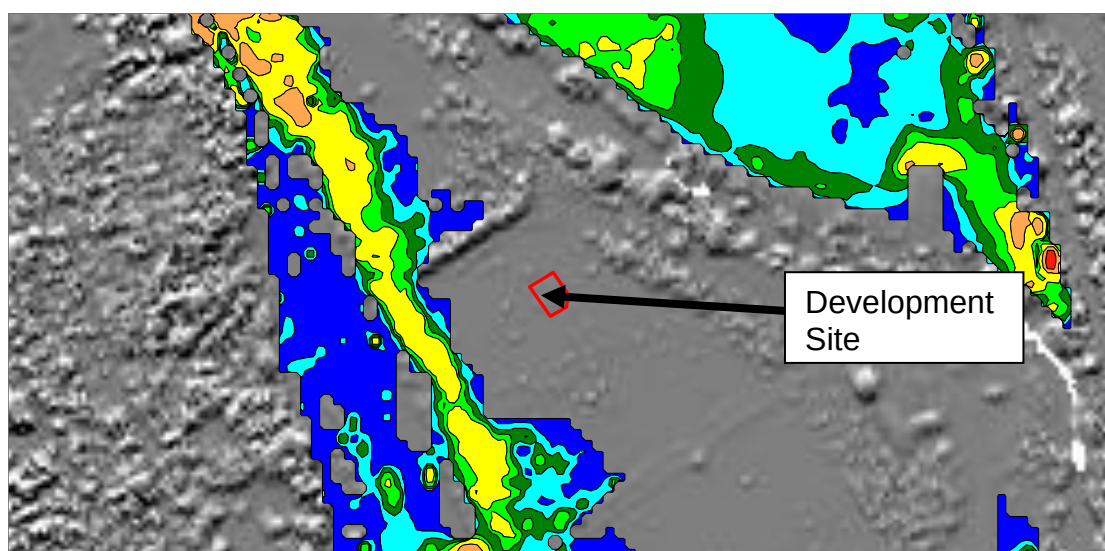


Figure 3.8 - Q100 + CC Velocity (Key on Table 3.1)

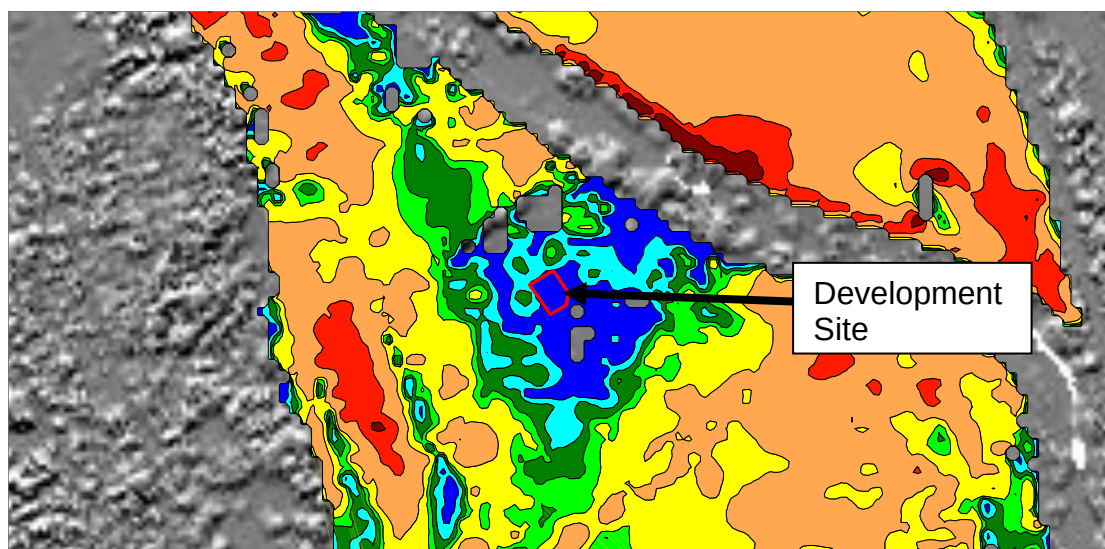


Figure 3.9 - Q1000 Velocity (Key on Table 3.1)

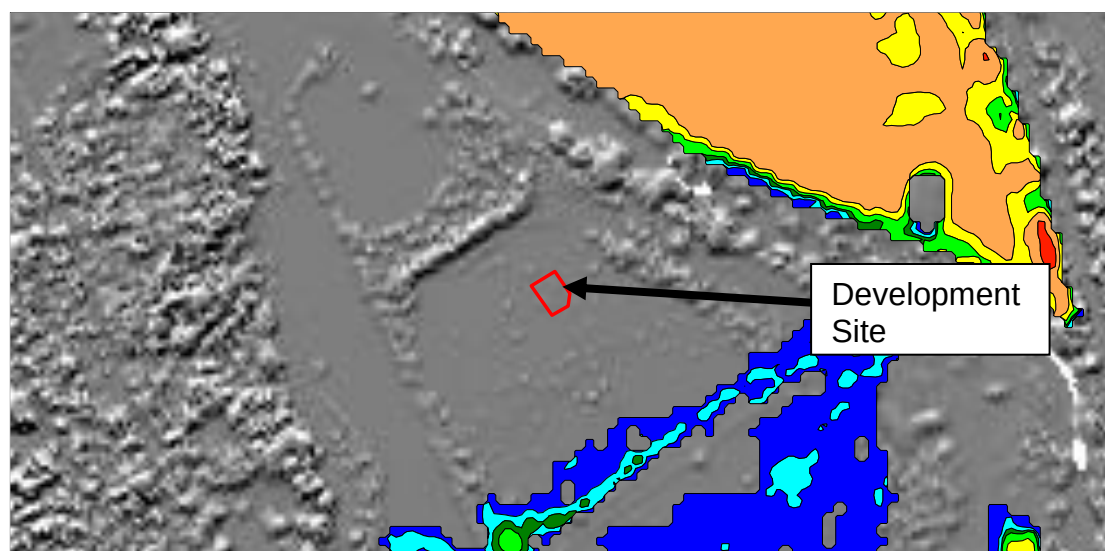


Figure 3.10 - Undefended Q100 Depth (Key on Table 3.1)

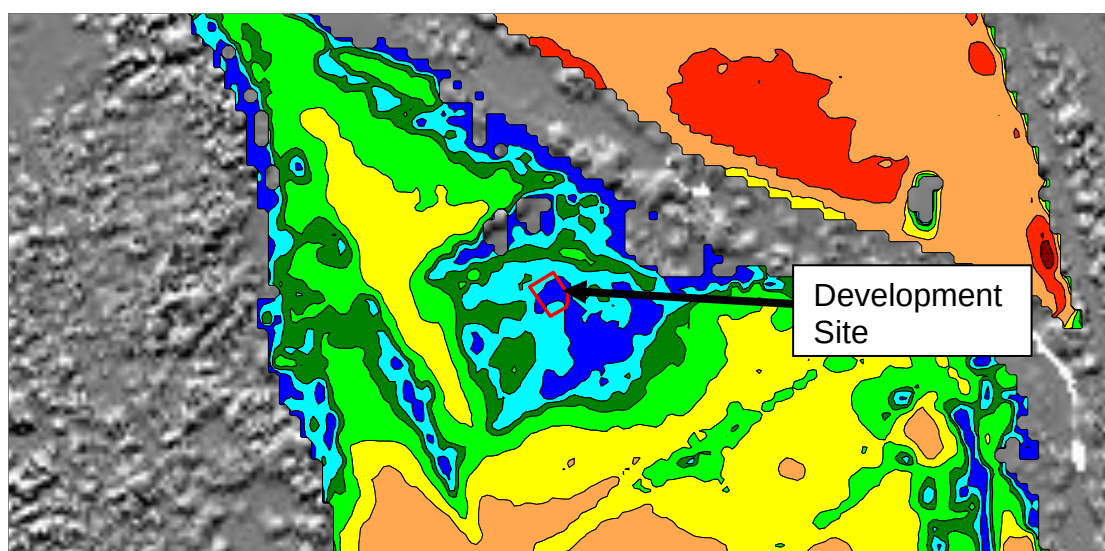


Figure 3.11 - Undefended Q1000 Depth (Key on Table 3.1)

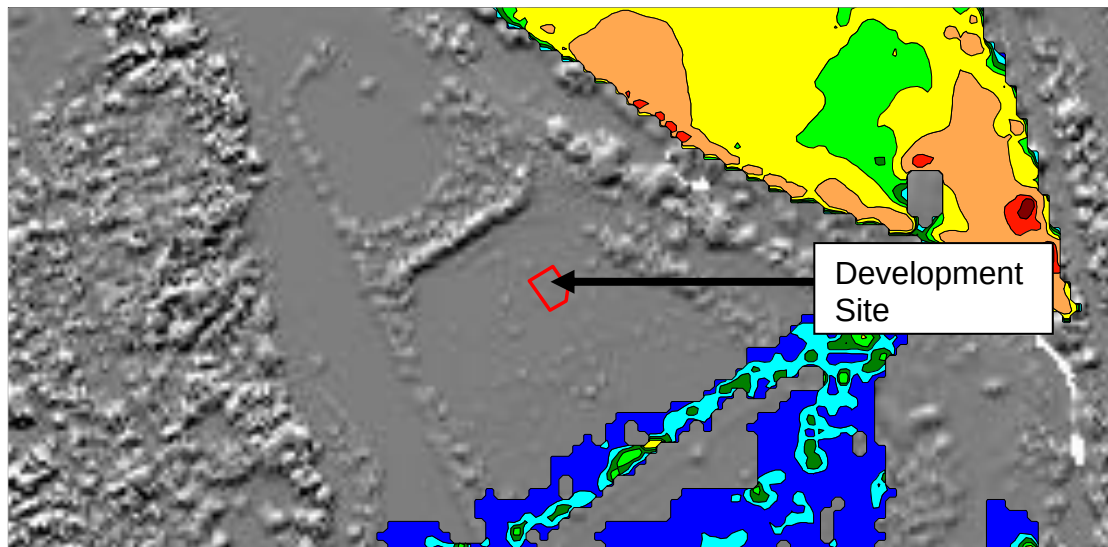


Figure 3.12 - Undefended Q100 Velocity (Key on Table 3.1)

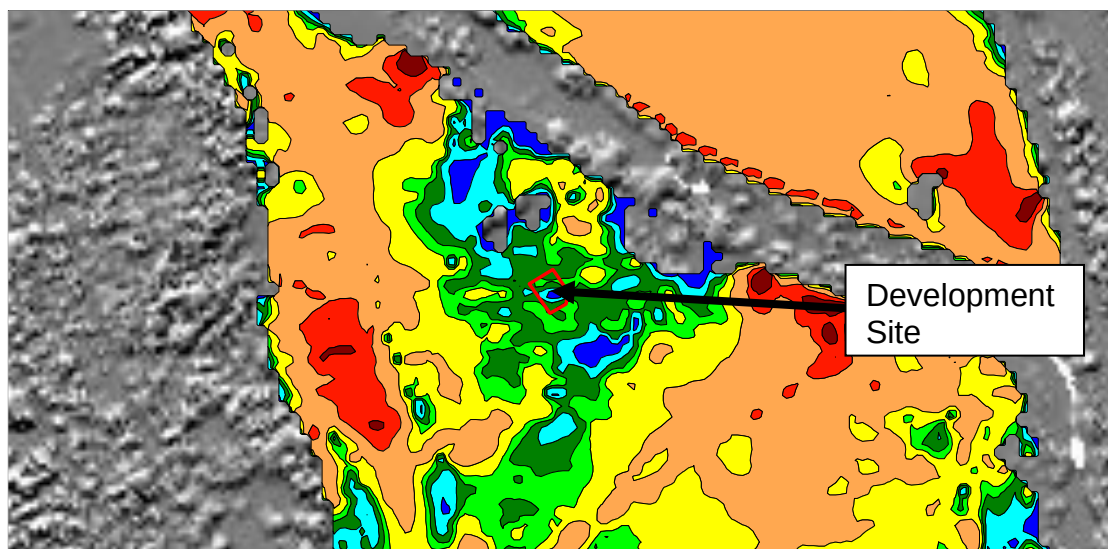


Figure 3.13 - Undefended Q1000 Velocity (Key on Table 3.1)

3.2 Tidal

The site is not considered at risk from tidal flooding.

3.3 Surface Water

NRW surface water map suggests that the site is expected to remain flood free during an event (see Figure 3.14).



Figure 3.14 – Surface Water Flood Map For Planning

3.4 Sewage Backflow.

Care should be taken to ensure that water from the foul sewer system is unable to back up into the day room, or flow into the flood water, and consideration should be given to installing a none return valve.

3.5 Sustainable Drainage

The surface water drainage system should be designed in accordance with the Welsh Government Standards and the SUDS manual. As the development is greater than 100m², SAB approval is also likely to be required.

3.6 Reservoir Failure

The area could be at risk of flooding should the Beacons, Llwyn-on, Cantref or the Pontsticill (Taf Fechan) reservoirs fail (see Figure 3.15). However, the risk of failure is considered to be low.

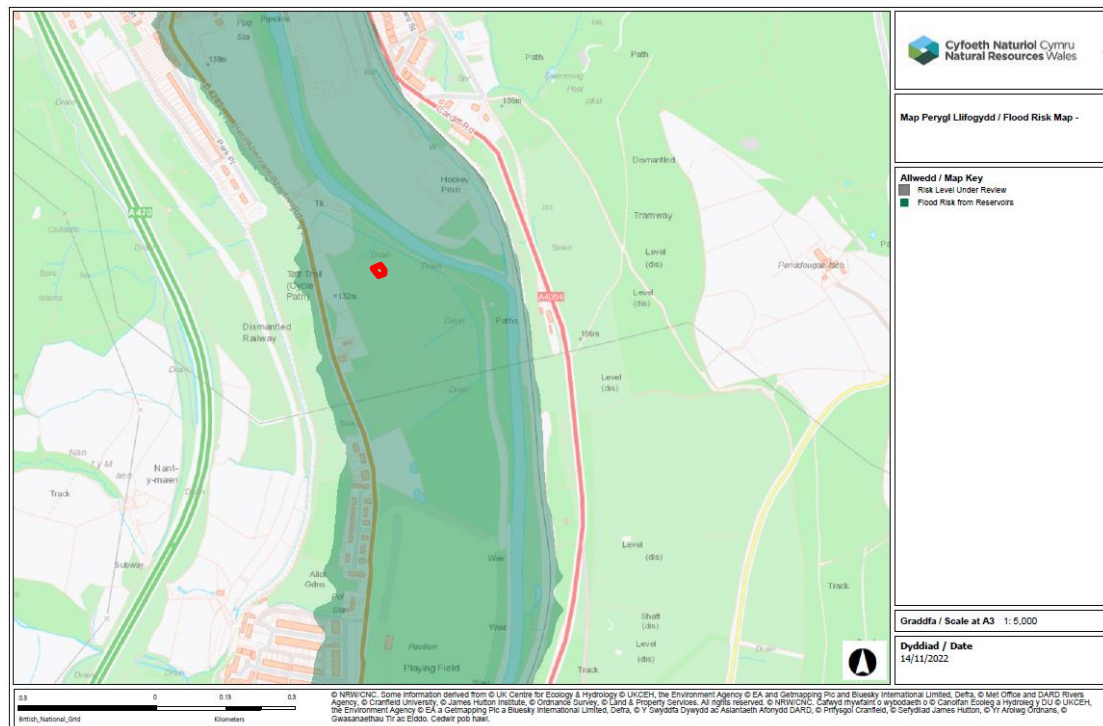


Figure 3.15 – Flooding From Reservoir Failure

3.7 Ground Water

The superficial geology, expected at the site of the development, consists of Clay, Silt, Sand and Gravel from alluvium over a bedrock geology of Sandstone, from the Rhondda Member (see Figure 3.16 and 3.17). When also taking the terrain into account the risk of groundwater flooding is considered to be medium.

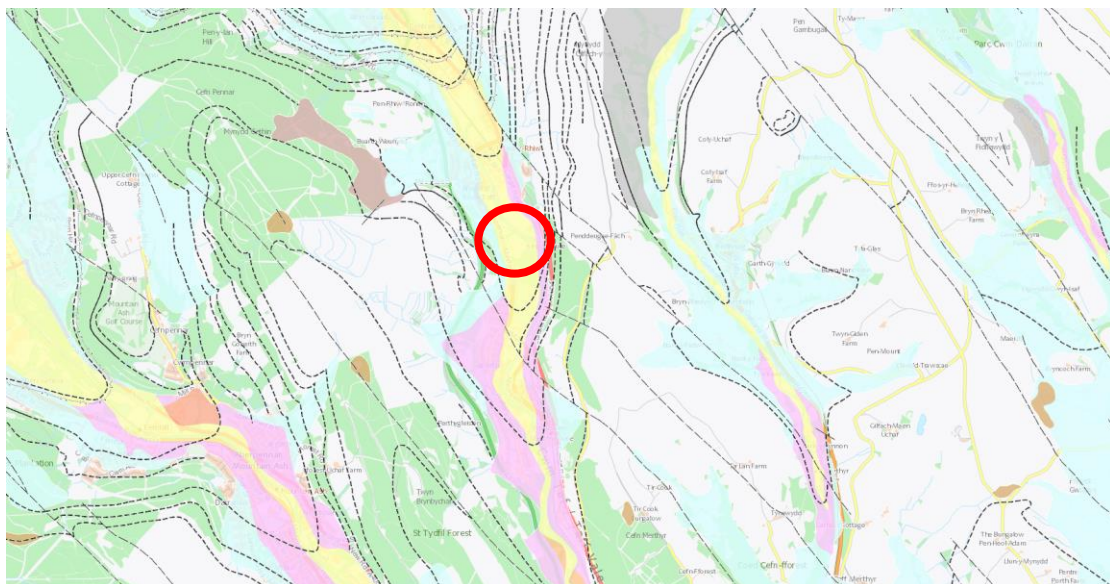


Figure 3.16 – Superficial Geology



Figure 3.17 – Bedrock Geology

4 FLOOD PROOF MEASURES

Section 3 indicates that the development could be at risk from extreme fluvial flooding. Flooding can result in the need for expensive repairs. As well as the direct damage caused to the caravan structure, flooding can impact in many other, and possibly more stressful, ways. The inconvenience of cleaning up a home and the loss of sentimental belongings can be immeasurable. There are methods, however, to limit and mitigate against the consequence of flood damage. Some of these are discussed in this section and should be considered where applicable.

Water can enter the caravan:

- Around the edges of closed doors;
- Through air vents;
- Backflow through overloaded sewers;
- Seepage at the panel edges;
- Around cable / services entrance into the caravan.

Dryproofing - Preventing the water from entering the caravan.

In the first instance it is possible to take measures to prevent the ingress of water (dryproof).

- There are several propriety barriers available, however, these can be expensive. If desirable, it might be possible to ensure that the walls of the day room are able to act as a barrier themselves. Care should be taken to ensure that the pointing and any external plastering are kept in good order and that all cracks and gaps around cables and ducts entering the building are sealed;
- Providing temporary covers to any low air vents. These covers should be removed once the risk of flooding is over. Preferably, however, the air vents should be located higher up on the walls;
- Erecting a temporary barrier in front of any external doors or installing flood protection doors;
- Installing a valve allowing the sewer system to be shut preventing any back flow.

In this instance the finished floor level of the day room could also be raised 150mm above the adjacent ground.

Wetproofing – Limiting the damage once water has entered a building.

Wetproofing measures, as listed below, should be considered for the day room and for the caravan where applicable, although they may not be appropriate for the caravan.

- Move valuable items to a higher level;
- Have solid concrete floors for the day room. Suspended floors are more difficult to clean and dry underneath;
- Have tiled floors or removable rugs in place of fitted carpets especially in the day room kitchen and bathroom;
- Use water resistant render and plaster for the day room walls;
- Use ceramic tiles for wall coverings especially in the kitchens and bathrooms;
- Avoiding timber frame construction. These are expensive to repair and dry;
- Use non water absorbing insulation;
- Use corrosion resistant fittings such as galvanised or stainless steel in place of mild steel;
- Ensure that electric cables are fed from above. Also keep sockets away from the floor level;
- Apply an appropriate damp proof course;

- Install fridges and freezers with motors high up from the floor;
- Install solid internal and external doors, effectively sealed for the day room;
- Avoid storage heaters;
- Ensure boilers are off the ground.

A flood response plan should be prepared and regularly maintained. All future occupiers should be made aware of the flood risk and what actions to take during an event. It is important to also have as much warning as possible to allow the flood response plan to be followed safely. This can be achieved by registering on the flood warning scheme provided by NRW (see Figure 4.1).

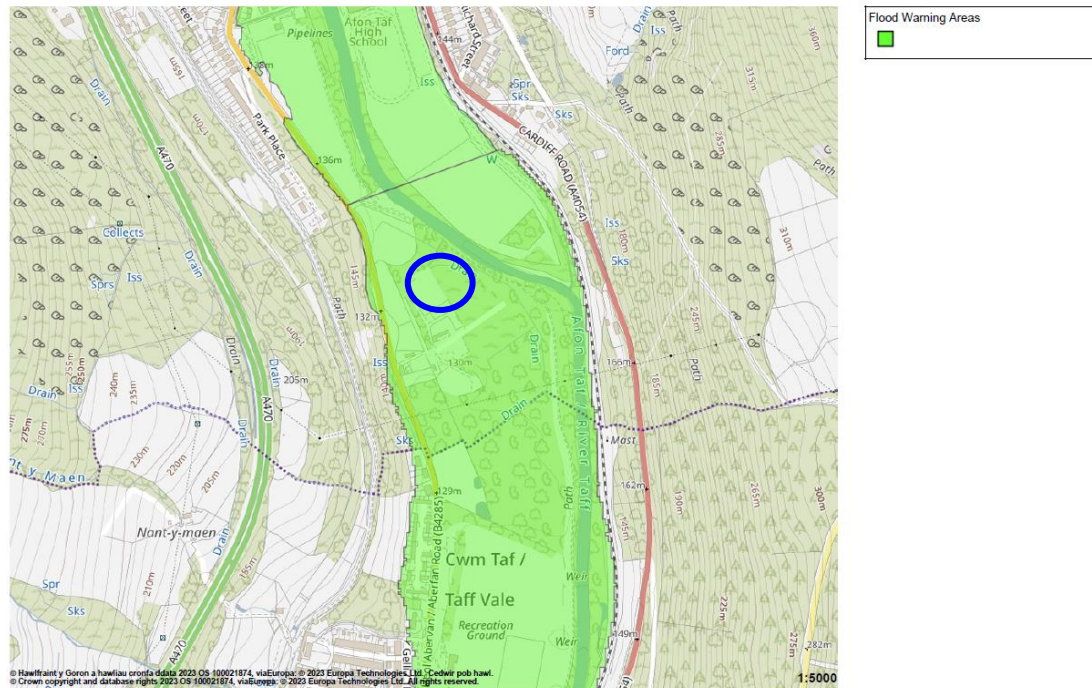


Figure 4.1 – NRW Flood Warning Area

5 CONCLUSION AND RECOMMENDATIONS

It is proposed to develop a static caravan pitch and day room on land near Ynysgored Cottages, Aberfan. As the pitch lies in a C1 flood zone, in accordance with TAN 15, the client wishes to evaluate the risk of flooding.

The development is not considered to be at risk from tidal or surface water flooding while the risk of flooding from reservoir failure is considered to be low. There is a medium risk from ground water flooding.

The site is also expected to remain flood free during a fluvial Q100 event, even when climate change is taken into consideration, although the access route may be affected. During the Q1000 event the flood depth is expected to be less than 100mm with a corresponding velocity of less than 0.15m/s. The flood risk can therefore be considered to be manageable in accordance with TAN 15. As the surrounding land lies in the ownership of the developer, and considering the shallow flood depth, any loss of flood storage capacity is unlikely to have an impact on third parties.

A sustainable drainage system will be needed for the development, in accordance with the requirements of the Welsh Government Standards and the SUDS manual. As the development is greater than 100m², SAB approval is also likely to be required.

To ensure that the residents remain safe during a flood event a Flood Response Plan should be prepared, disseminated and regularly maintained.

Recommendations

In developing the site, it is recommended that:

- The finished floor level of the day room is set 150mm above the surrounding ground.
- A sustainable drainage system is included in the development.
- SAB approval is applied for.
- An emergency evacuation plan is prepared, maintained and effectively disseminated to all future occupiers.
- The site is registered on the flood warning scheme provided by NRW.