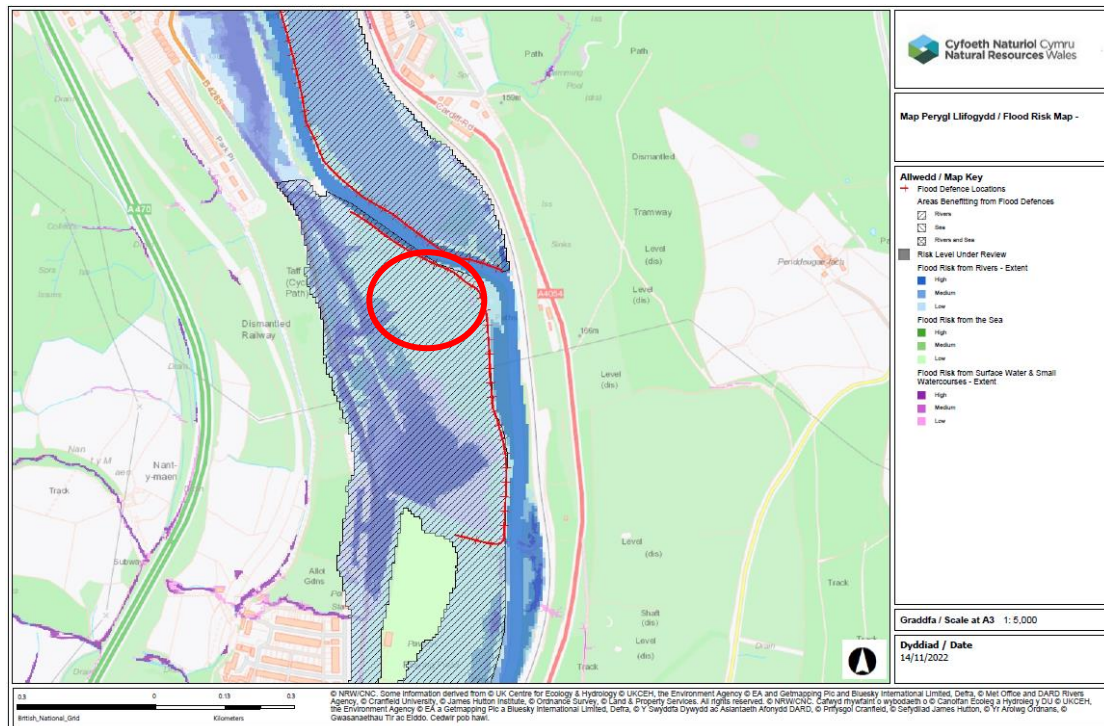


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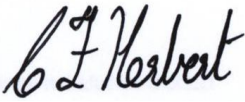
Static Caravan Pitch and Day Room, Near Ynysgored Cottages, Aberfan Flood Consequence Assessment Report



**May 2025
Final
Revision C**

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Signed 

Date May 2025

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1 INTRODUCTION

It is proposed to develop a static caravan pitch and day room on land near Ynysgored Cottages, Aberfan and currently used as a general yard and stabling. The site is located within Flood Zone 3 (see Figure 1.1), as shown on the River Flood Map For Planning, referred to in TAN 15. This indicates that the area potentially could be at risk during a 1 in 100 year fluvial event, taking 100 years of climate change into consideration. The applicant appreciates, therefore, the need to assess the consequence of flooding.

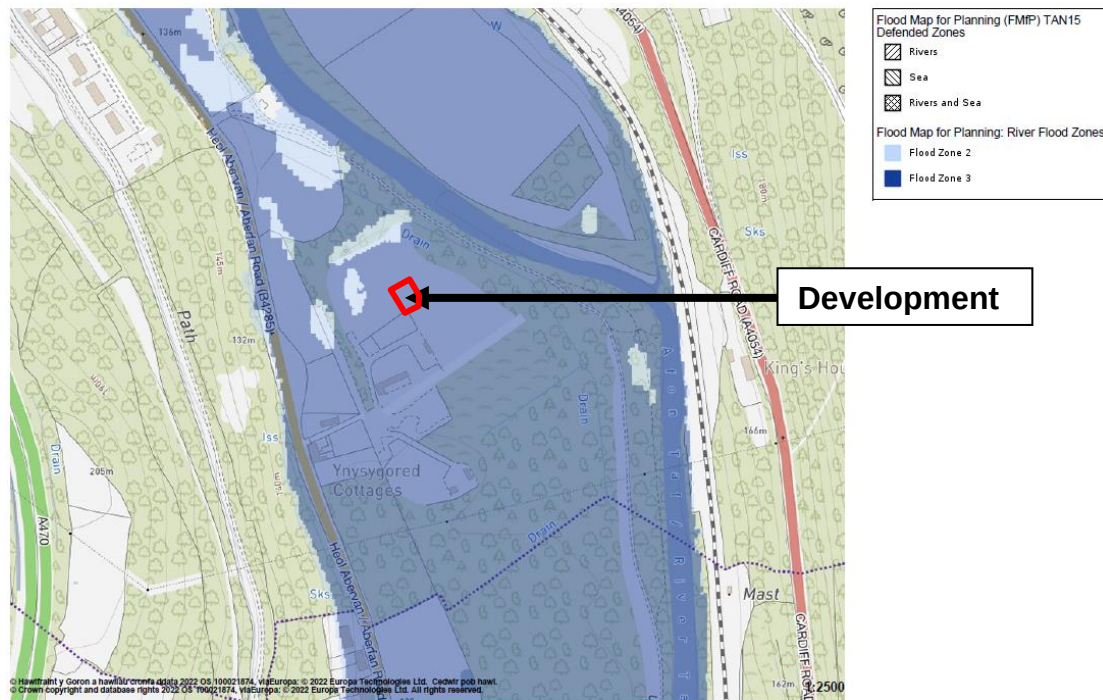


Figure 1.1 – River Flood Map For Planning

The prime objective of the Flood Consequences Assessment is to develop an appreciation of:

- The risk and consequences of flooding on the development; and
- The risk and consequences (i.e. the overall impacts) of the development on flood risk elsewhere.

It is noted that no new highly vulnerable development, **on greenfield land**, should be permitted in Zone 3, regardless of the conclusion of any Flood Consequences Assessments. In addition, Welsh Ministers must be notified of any such proposal a planning authority intends to approve. **In this instance, however, the proposals are located on a developed site.**

The assessment should consider a range of potential flooding scenarios including a 1 in 1000 year event with an allowance for climate change in line with current Welsh Government guidance.

As noted, the Flood Map for Planning allows for 100 years of climate change. Where a new development has a shorter lifetime, it is reasonable that the flood consequences assessment focusses on potential risks during the development's reduced and expected lifetime.

This assessment will help the planning authority determine whether the risk and consequences of flooding are acceptable and can be managed over the lifetime of development. The assessment will also establish whether appropriate measures can be incorporated into the design to ensure that the risk to life, damage to property and disruption to people, over its lifetime, are minimised and that there is no increase in the risk of flooding elsewhere.

The National Strategy recognises that many communities are located in areas at higher risk from flooding. TAN 15, however, recognises that these communities must be allowed to adapt, change, and regenerate in the knowledge of what the science is showing. As such consideration will be given to moving the compound to higher land. Nevertheless, development and redevelopment should be avoided where there is a risk of being impacted by coastal erosion over the lifetime of the development. This is not an issue in this instance.

The Flood Map For Planning are based on the Flood Risk Assessment Maps (see Figure 1.2) plus 100 years of climate change. 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.

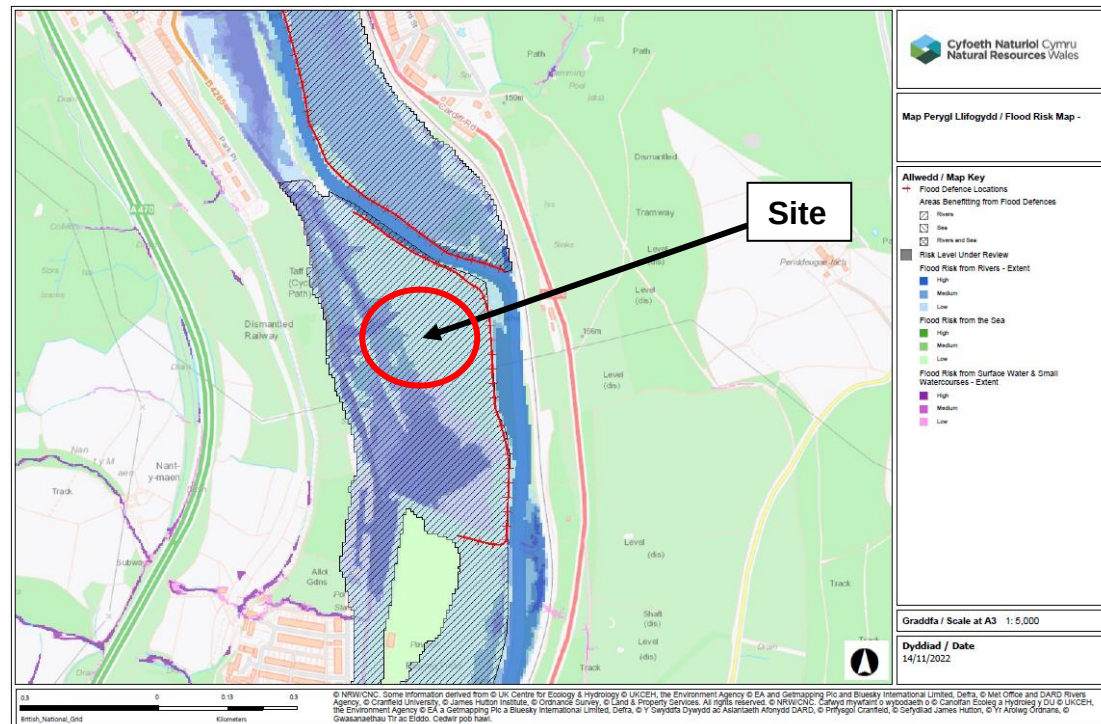


Figure 1.2 – NRW Flood Risk Assessment Map

Considering the proximity of the site to the Afon Taf, it is possible that the development could be at risk from fluvial inundation. With this in mind, the client recognises the need to undertake a Flood Consequence Assessment to evaluate the risk and the implication of any flooding on the site. The assessment should be in accordance with the requirements of Section 11 of TAN 15. Francis Sant have been employed to undertake this task based on information currently available (ie. no additional modelling).

Section 2 of this report describes the location of the development while the method and risk of flooding, from various sources, are considered in Section 3. Section 4

considers sustainable drainage and potential resilient measures are discussed in Section 5. The conclusions of the study, along with the main recommendations, are provided in Section 6.

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.

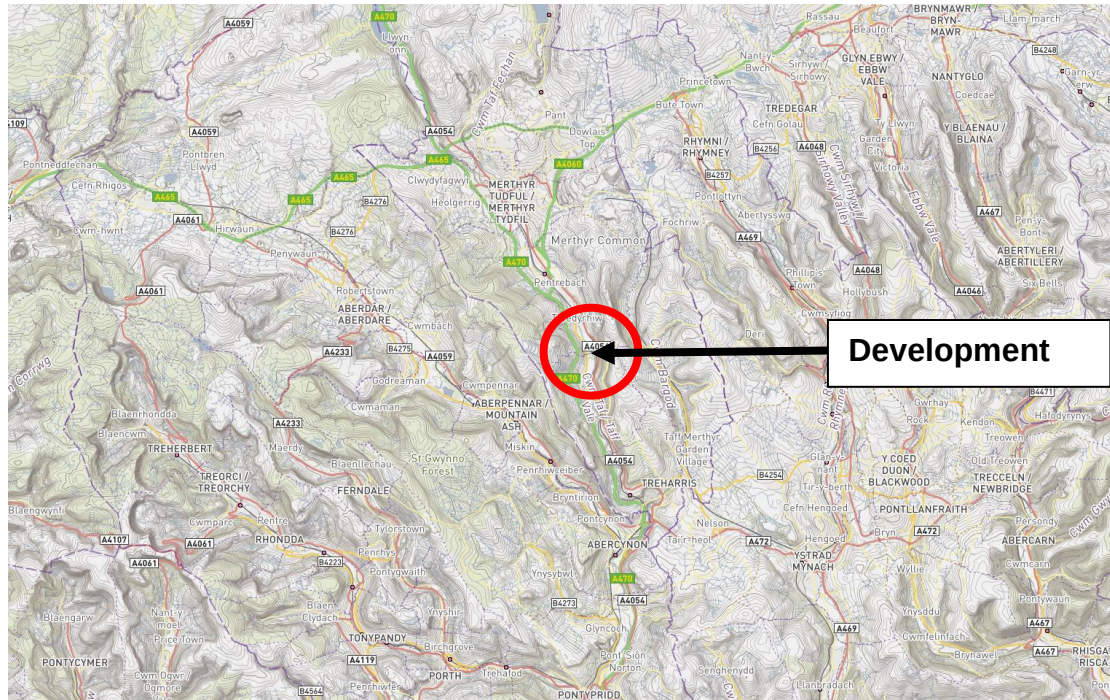


Figure 2.1 – Location Plan

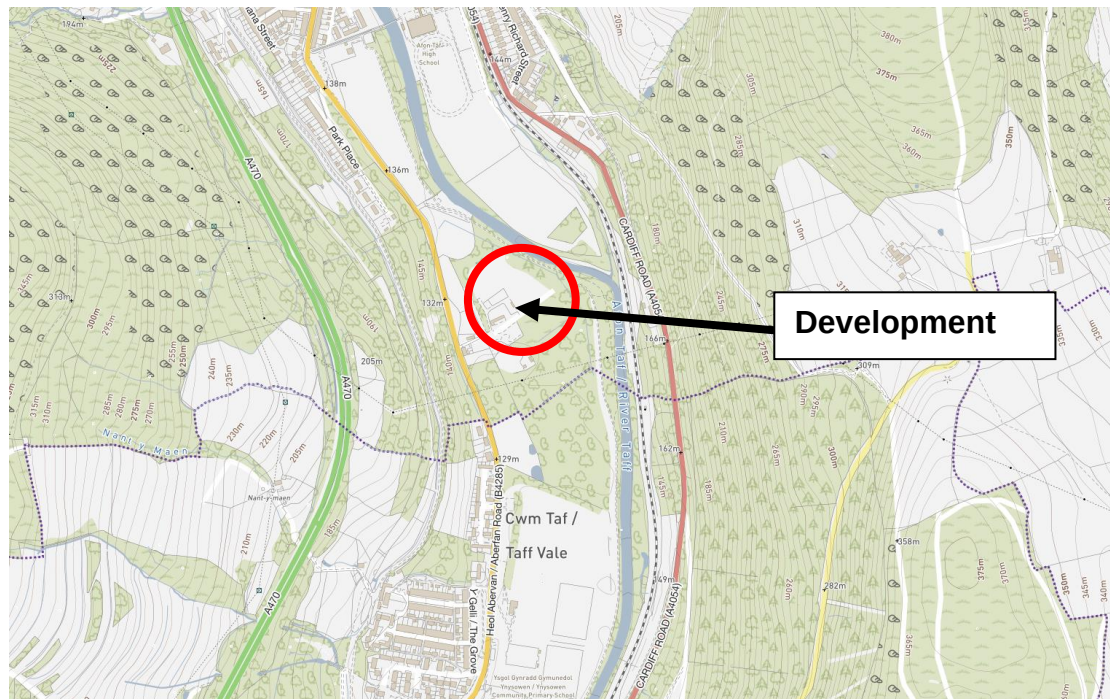


Figure 2.2 – Plan of Area

To adapt the site in order to reduce the risk of flooding the compound will be moved to higher land some 20m to the north (see Figure 2.3) with the existing yard reinstated as open pasture.

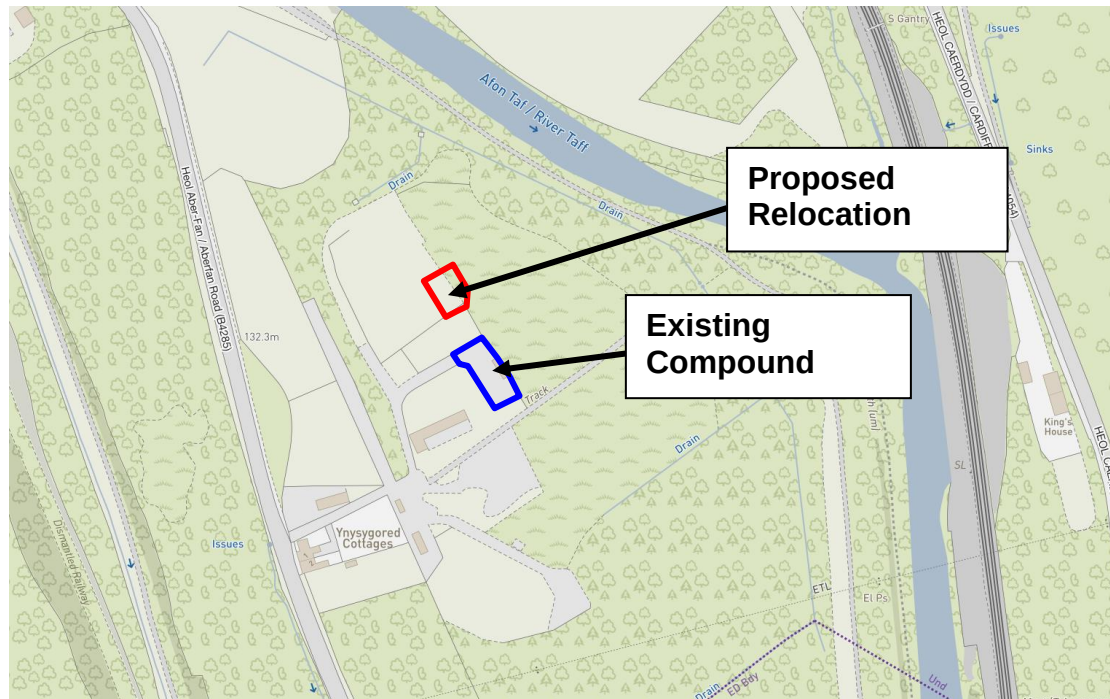


Figure 2.3 – Plan of Site

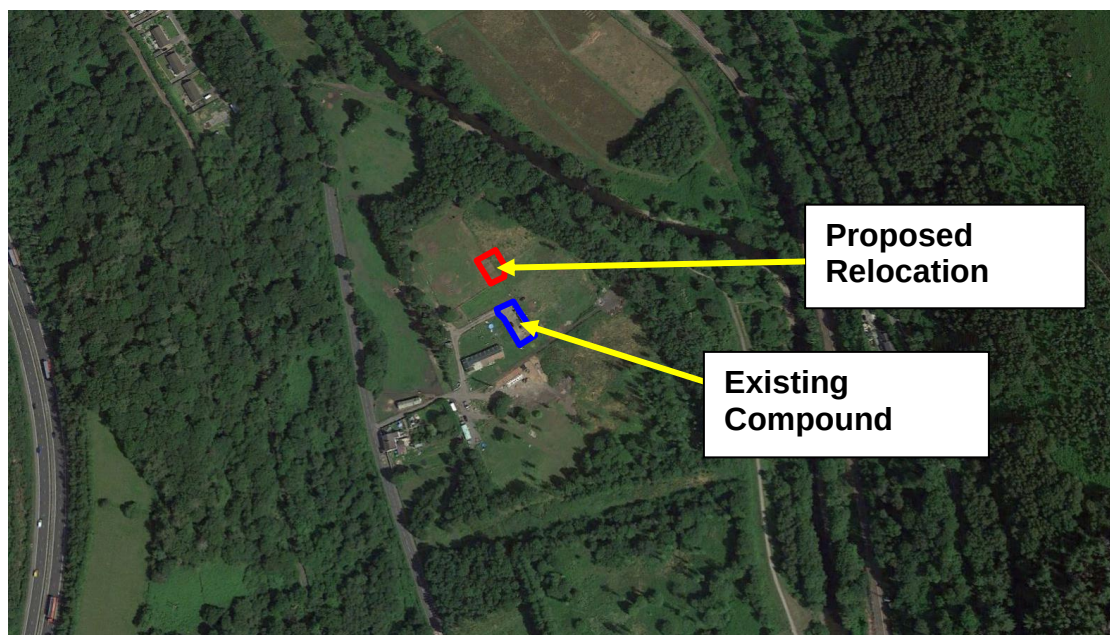


Plate 2.1 – Aerial View of Site

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).

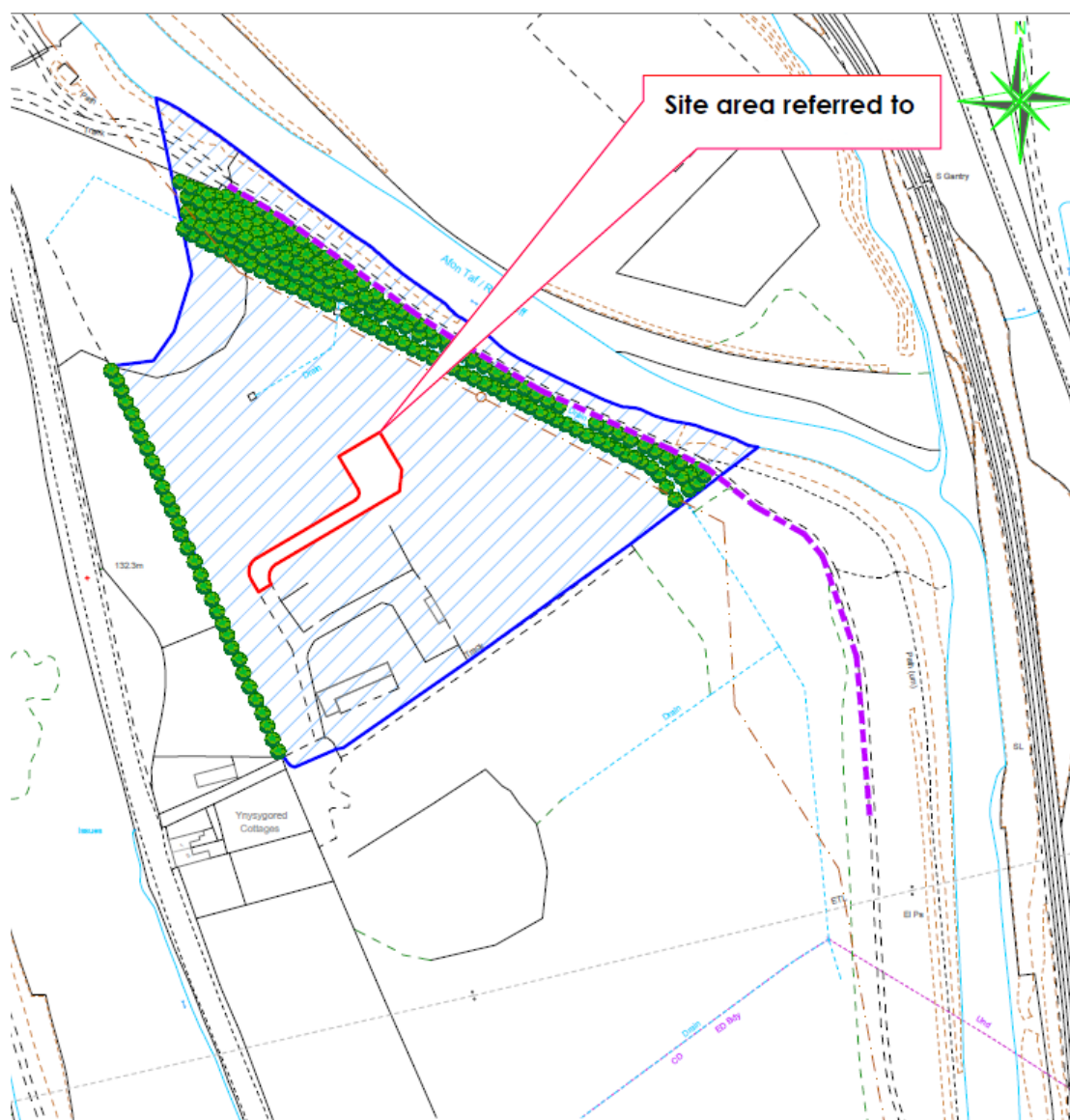


Figure 2.4 – Plan of Property



Figure 2.5 – Block Plan of Proposed Development

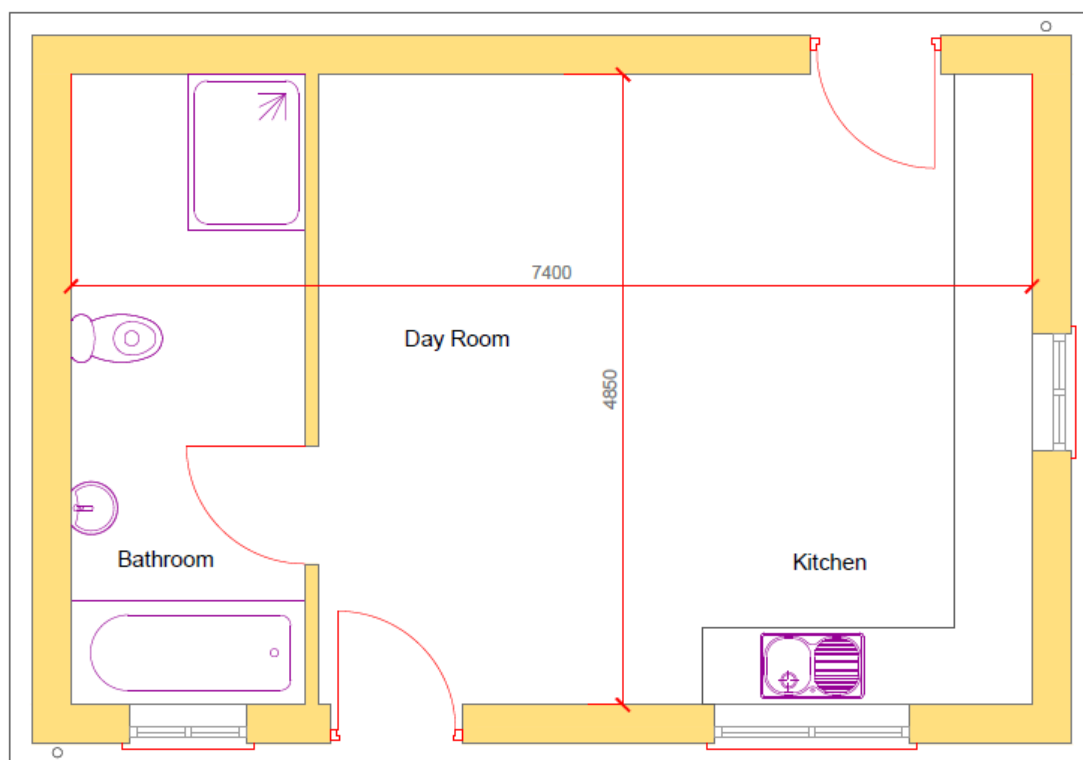


Figure 2.6 – Plan of Proposed Day Room

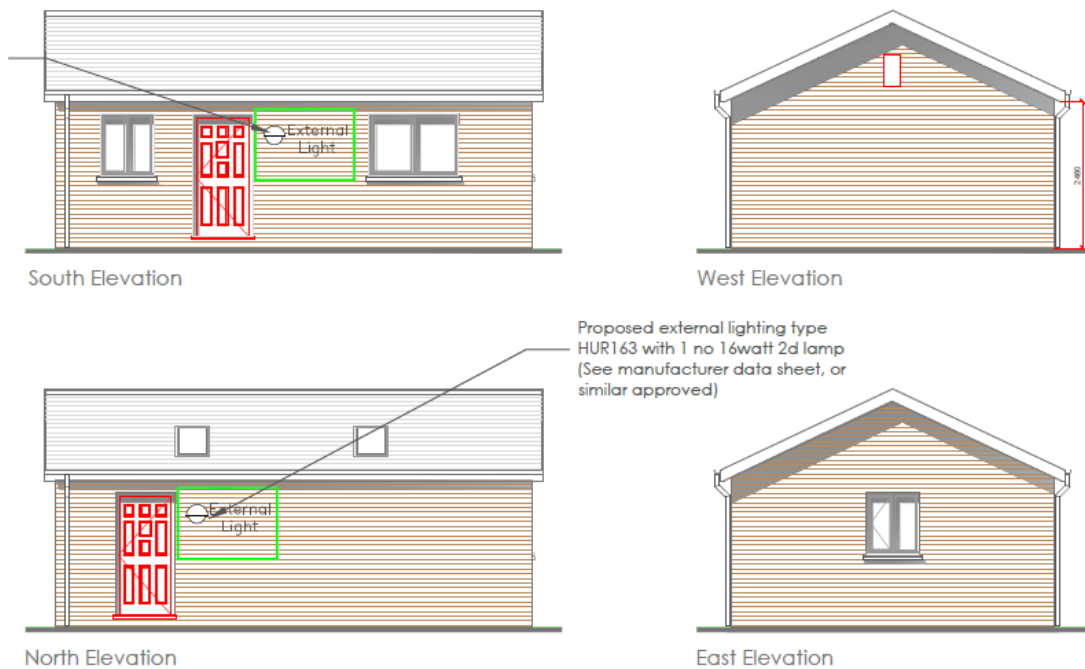


Figure 2.7 – Elevations of Proposed Day Room

Topography

Lidar data (see Figure 2.8) shows that the existing compound is set on land ranging from 131.0m AOD to 131.6m AOD while the proposed relocated compound will be set on slightly higher land ranging between 133.0m AOD and 133.4m AOD with the terrain falling from north to south.

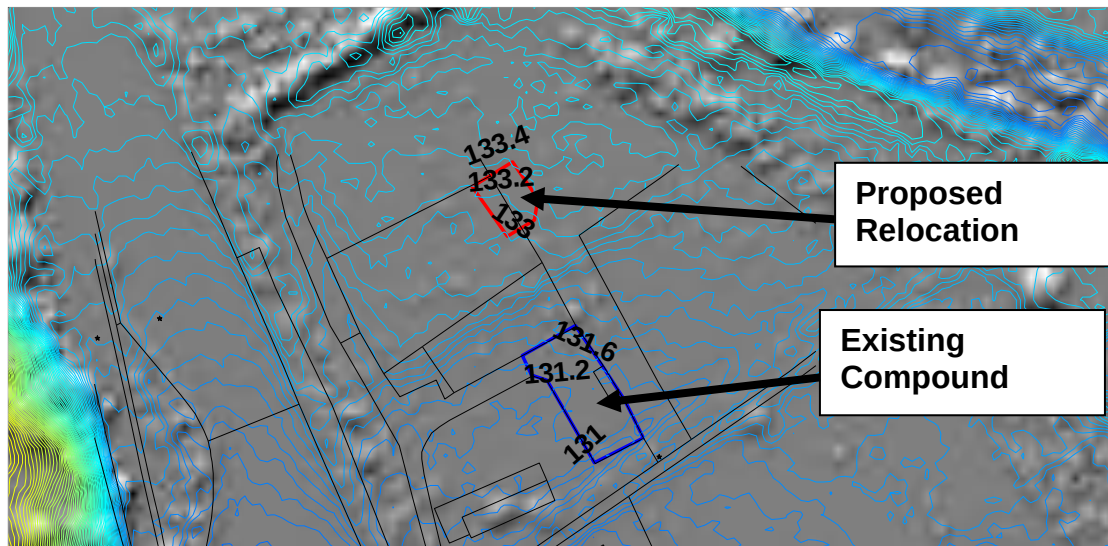


Figure 2.8 – Lidar Data for the Site

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.

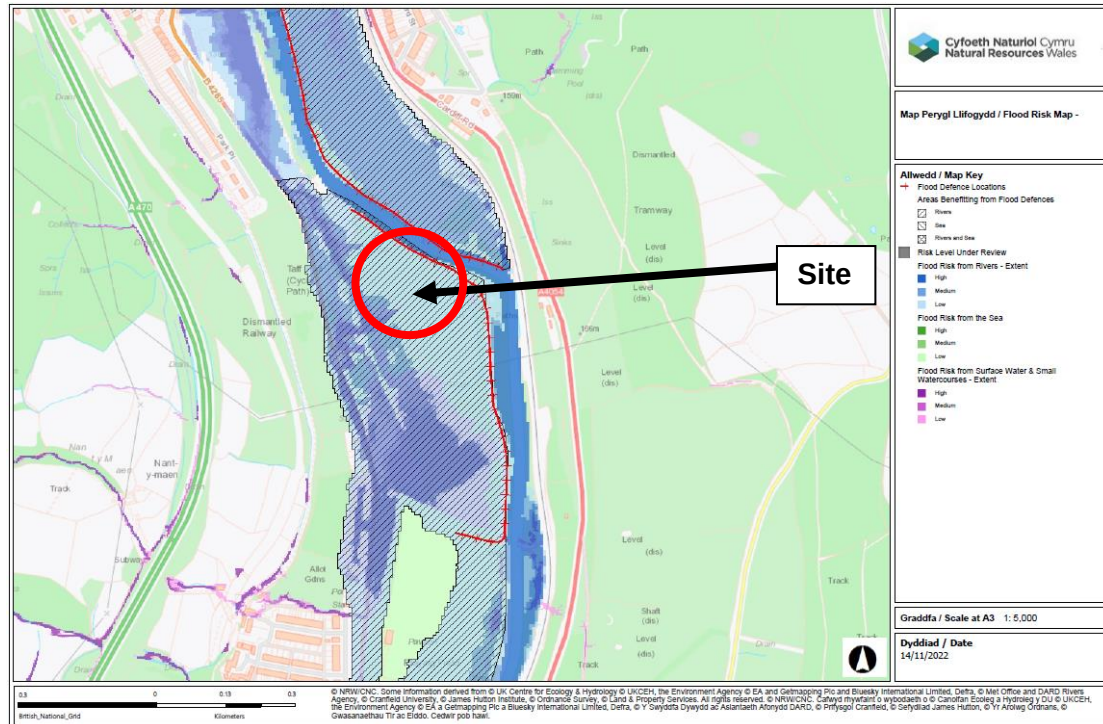


Figure 3.1- NRW Flood Risk Assessment Map

3.1 Fluvial

The River Flood Map For Planning, which allows for 100 years of 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).

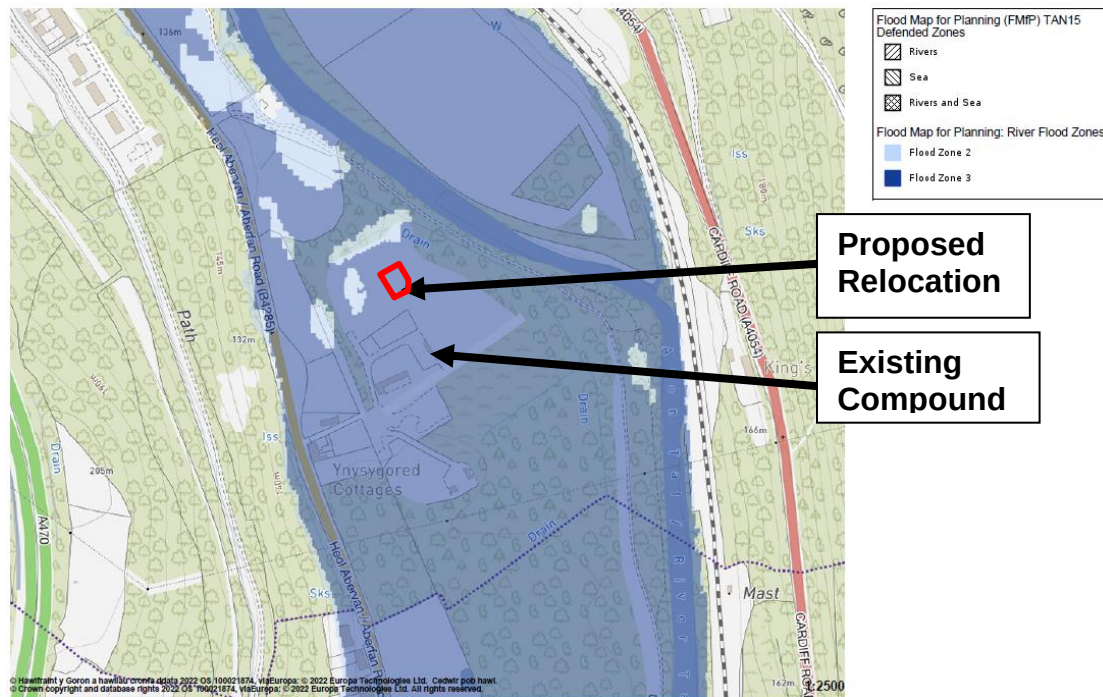


Figure 3.2 – River Flood Map For Planning

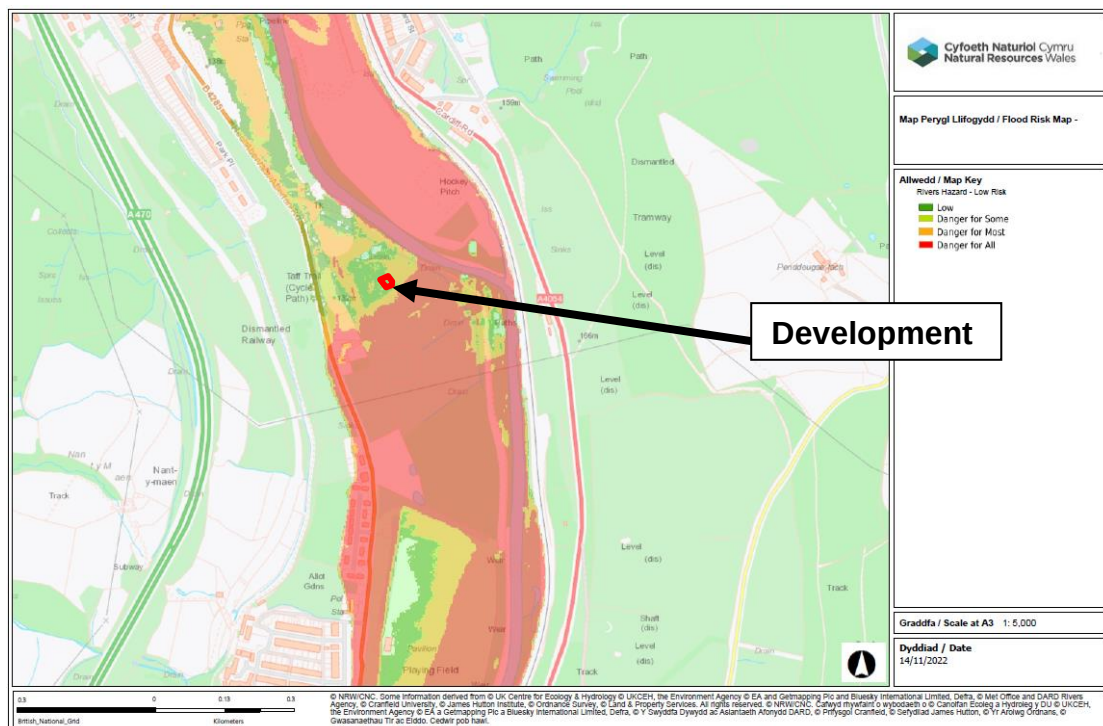


Figure 3.3 - Q1000 Hazard Map Risk

The results from the NRW 2D TUFLOW model suggests that the proposed relocated compound 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). Some flood water could flow across the proposed compound during the Q1000 event, however, the flood depth is 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). There could be some flood water on the edge of the existing compound with a flood depth of up to 400mm.

The flood depth on the lower end of the existing site could exceed 600mm with a corresponding velocity of up to 1m/s.

These values assume that the defences for the area are in place. Should the defences fail, or be removed, the proposed compound is expected to remain flood free during the Q100 event while the flood depth will be less than 200mm during the Q1000 event (see Figure 3.10, 3.12 and Table 3.1). The corresponding velocity is expected to be less than 0.6m/s (see Figure 3.13 and Table 3.1). At the existing compound, the lower half of the area could be at risk of flooding during the Q100 undefended event with a flood depth of up to 0.3m and a corresponding velocity of up to 0.45m/s. During the Q1000 the flood depth could extend up to 2m on the lower end of the site with a corresponding velocity also reaching up to 2m/s.

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

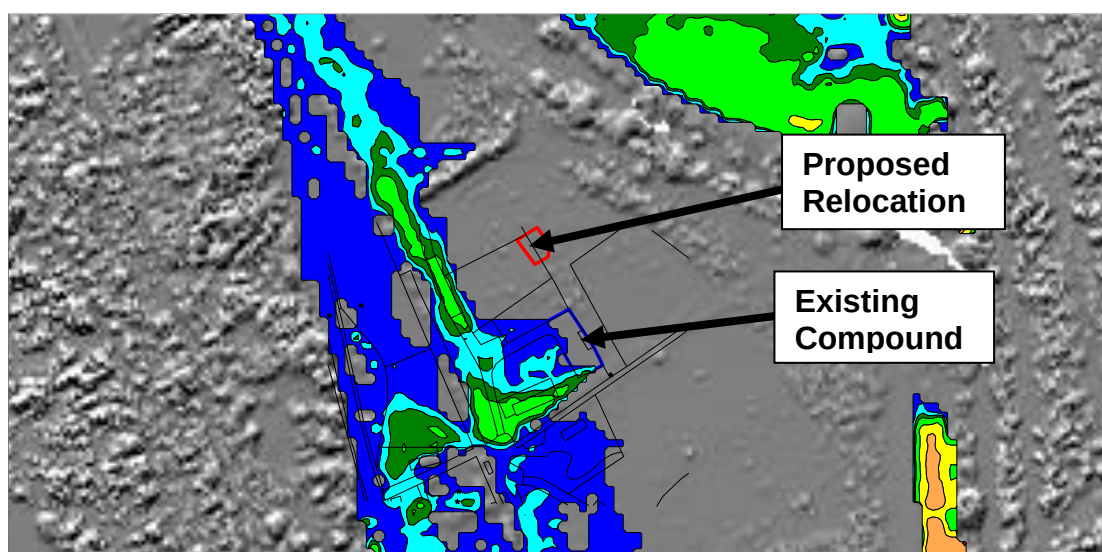


Figure 3.4 - Q100 Depth (Key on Table 3.1)

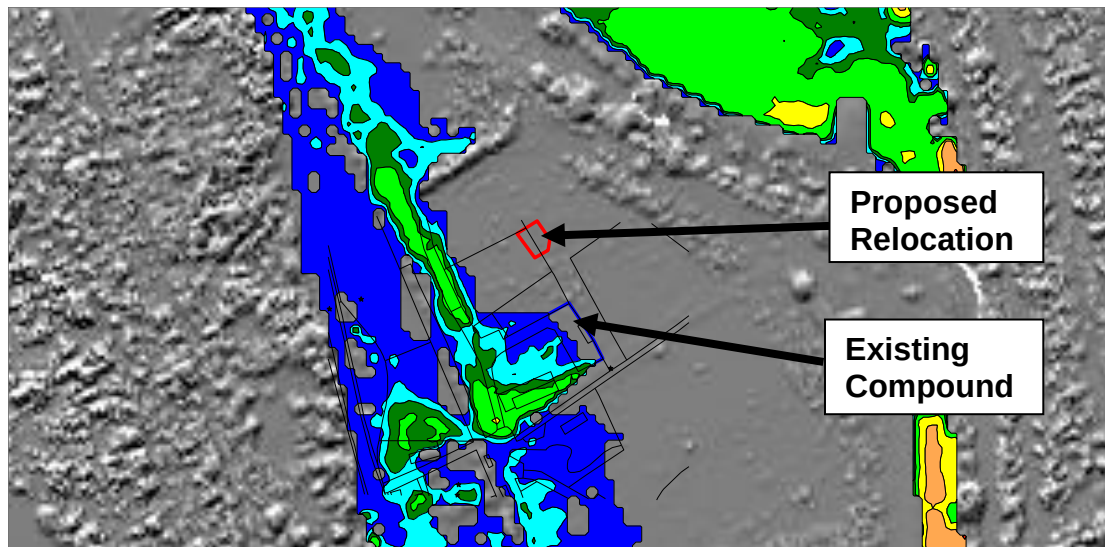


Figure 3.5 - Q100 With Climate Change - Depth (Key on Table 3.1)

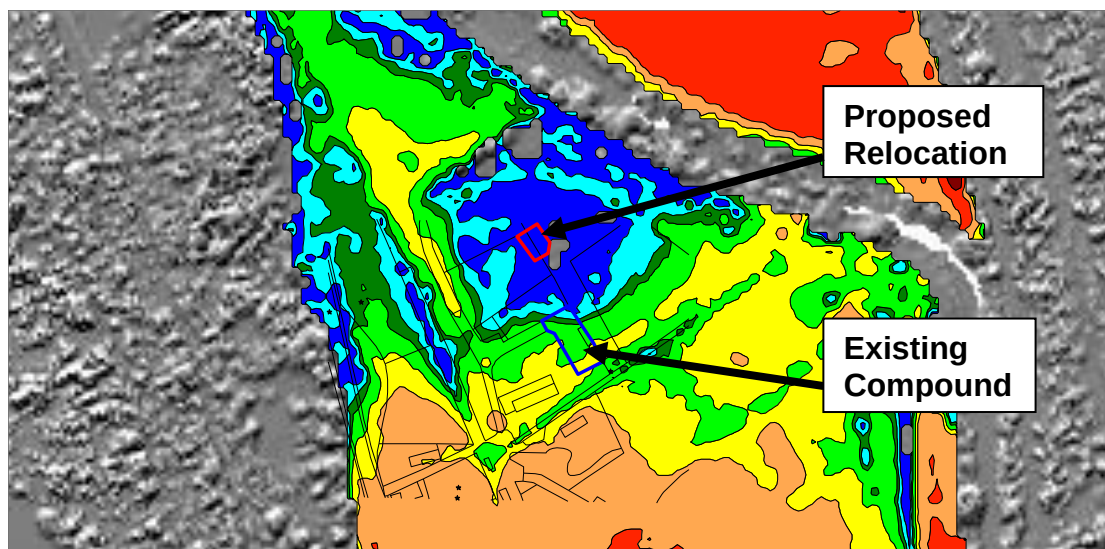


Figure 3.6 - Q1000 Depth (Key on Table 3.1)

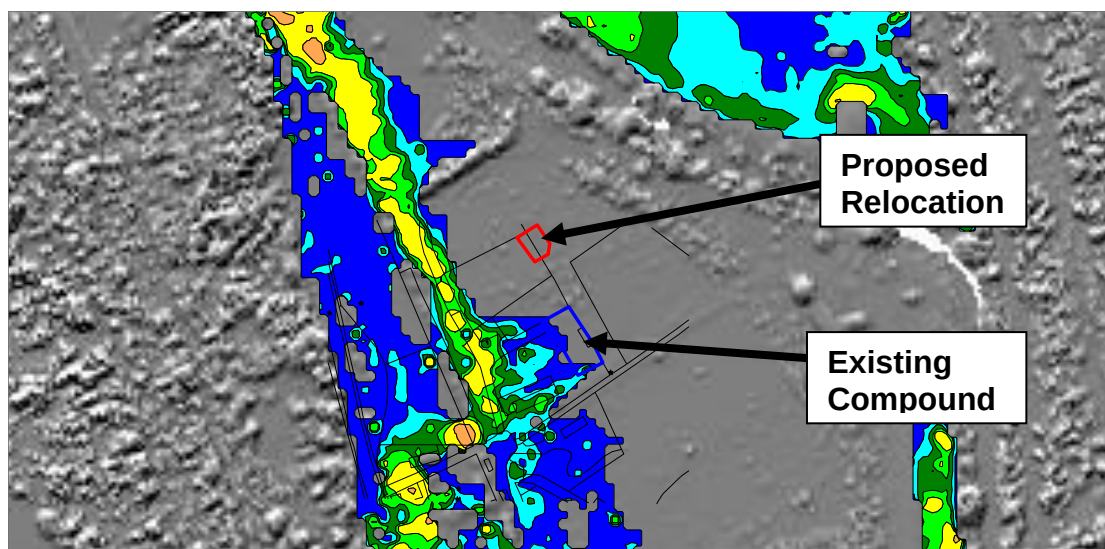


Figure 3.7 - Q100 Velocity (Key on Table 3.1)

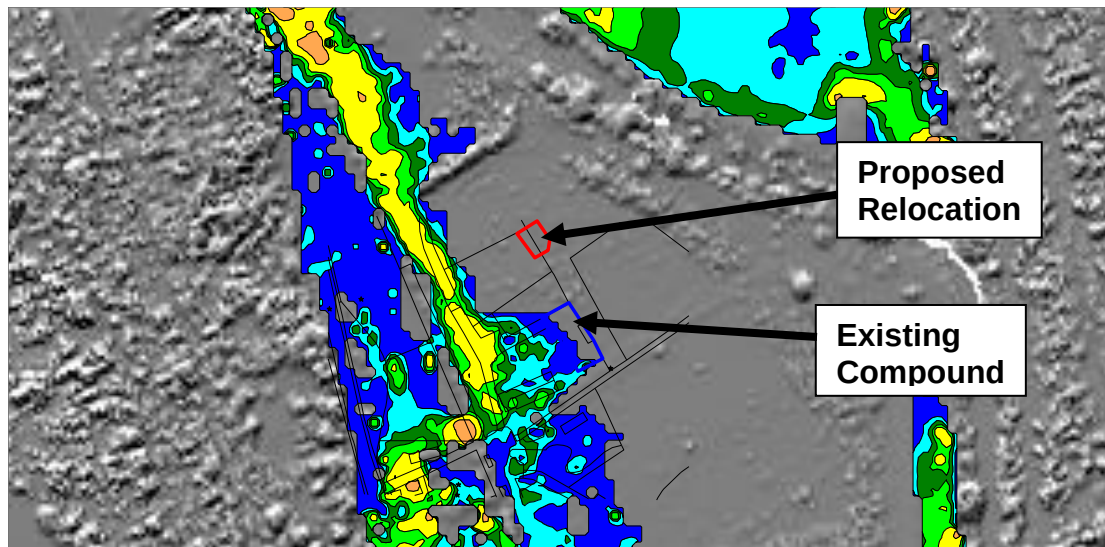


Figure 3.8 - Q100 + CC Velocity (Key on Table 3.1)

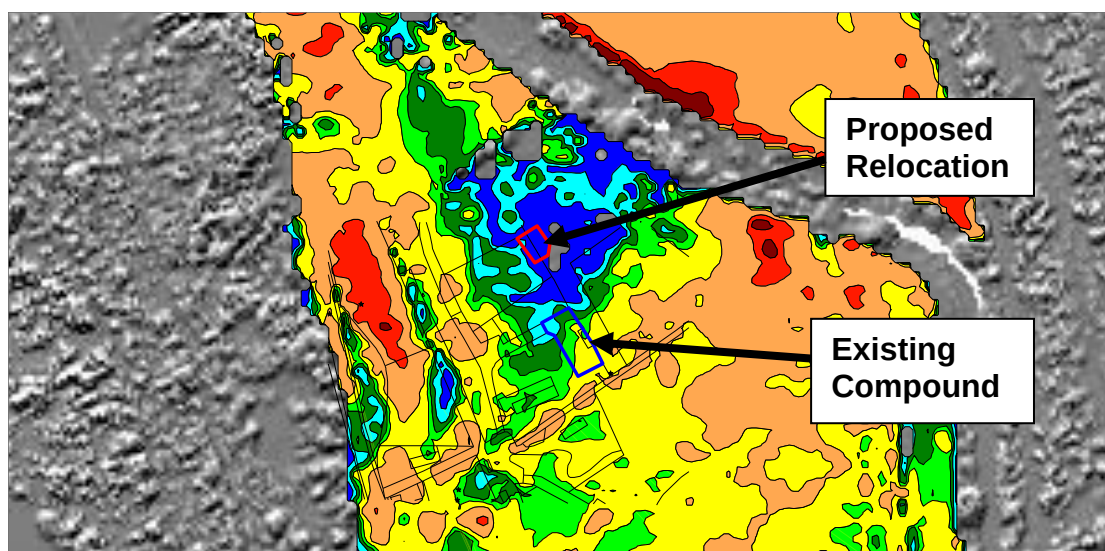


Figure 3.9 - Q1000 Velocity (Key on Table 3.1)

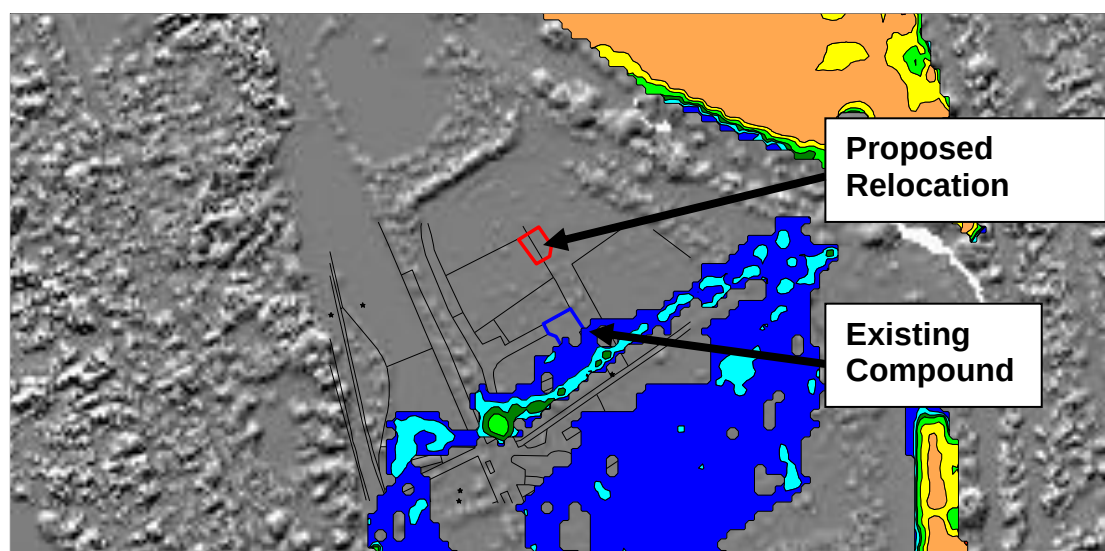


Figure 3.10 - Undefended Q100 Depth (Key on Table 3.1)

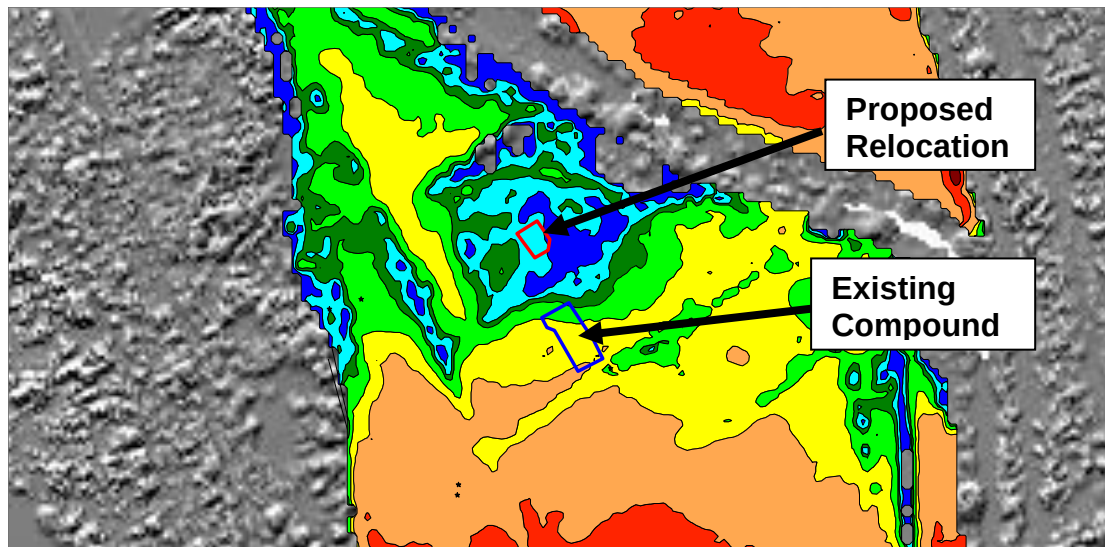


Figure 3.11 - Undefended Q1000 Depth (Key on Table 3.1)

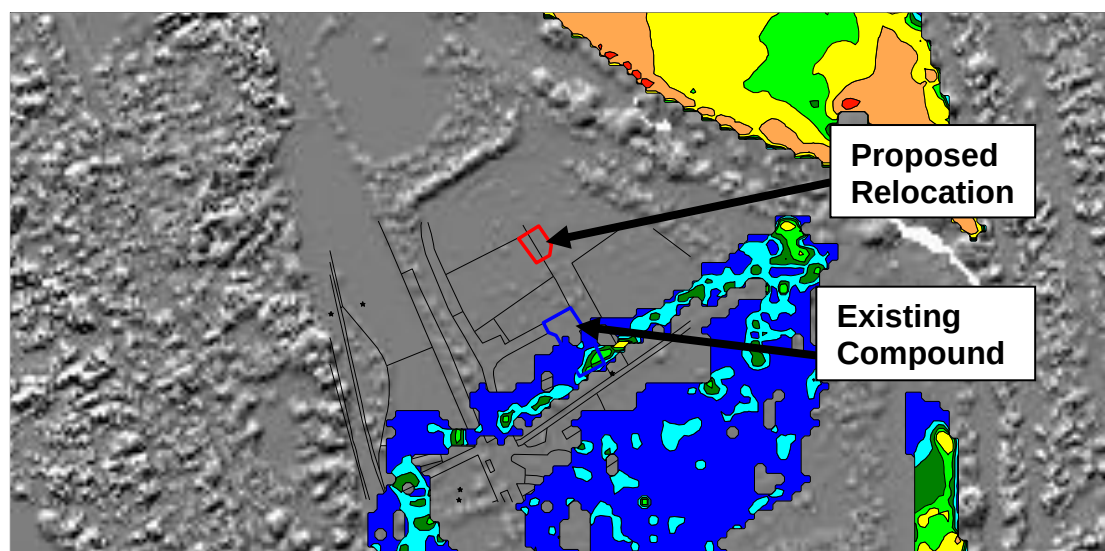


Figure 3.12 - Undefended Q100 Velocity (Key on Table 3.1)

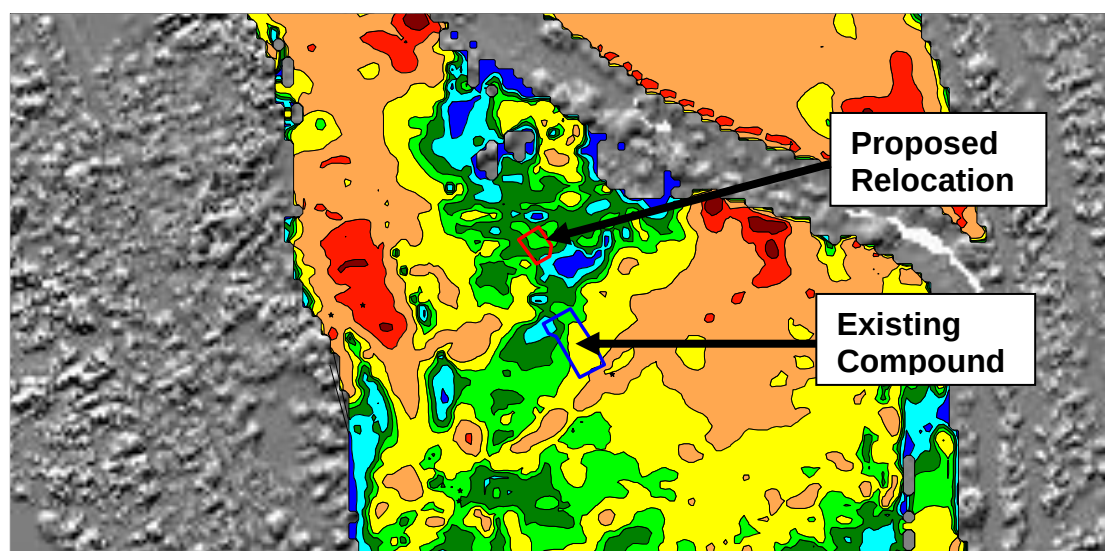


Figure 3.13 - Undefended Q1000 Velocity (Key on Table 3.1)

3.2 Tidal

The site is not considered at risk from tidal flooding or coastal erosion.

3.3 Surface Water

The Surface Water and Small Watercourse Flood Map For Planning suggests that the proposed compound is expected to remain flood free during even a Q1000 event although there could be a risk of flooding on the lower end of the existing compound (see Figure 3.14).

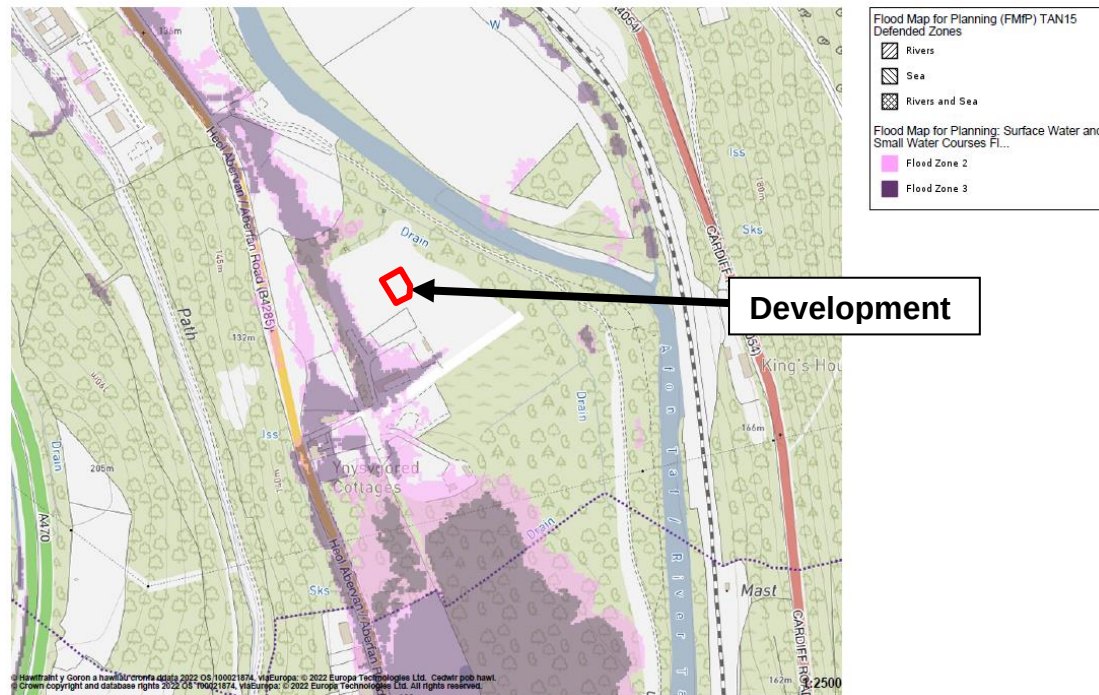


Figure 3.14 – Surface Water Flood Map For Planning

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 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.

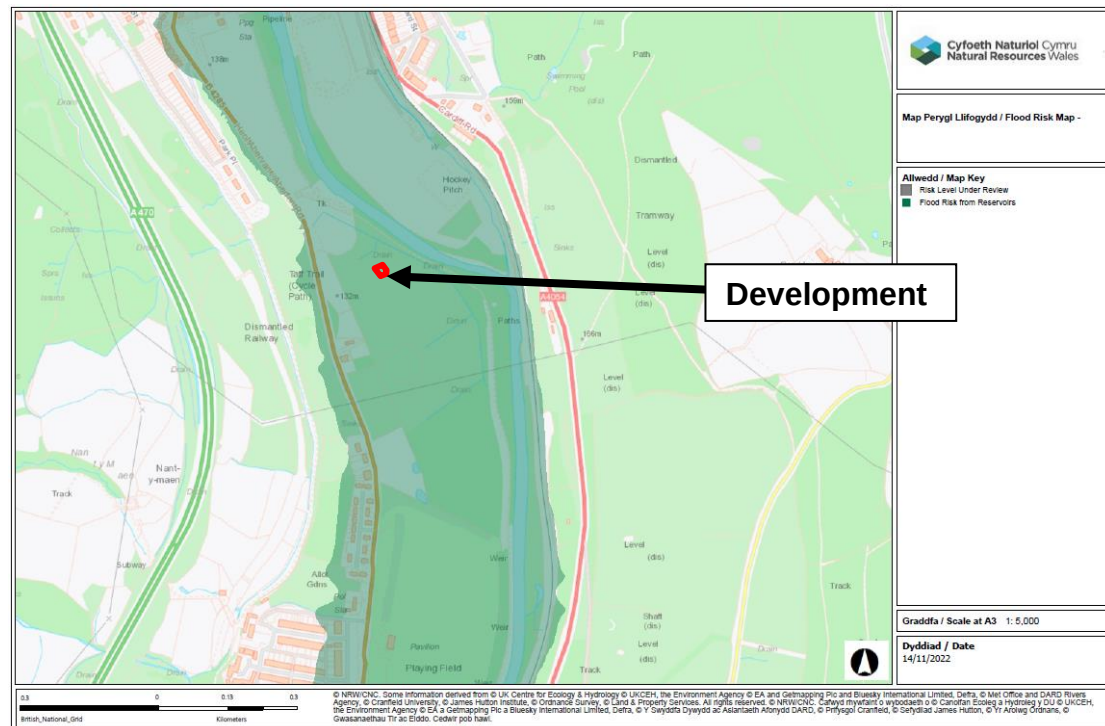


Figure 3.15 – Flooding From Reservoir Failure

3.6 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.

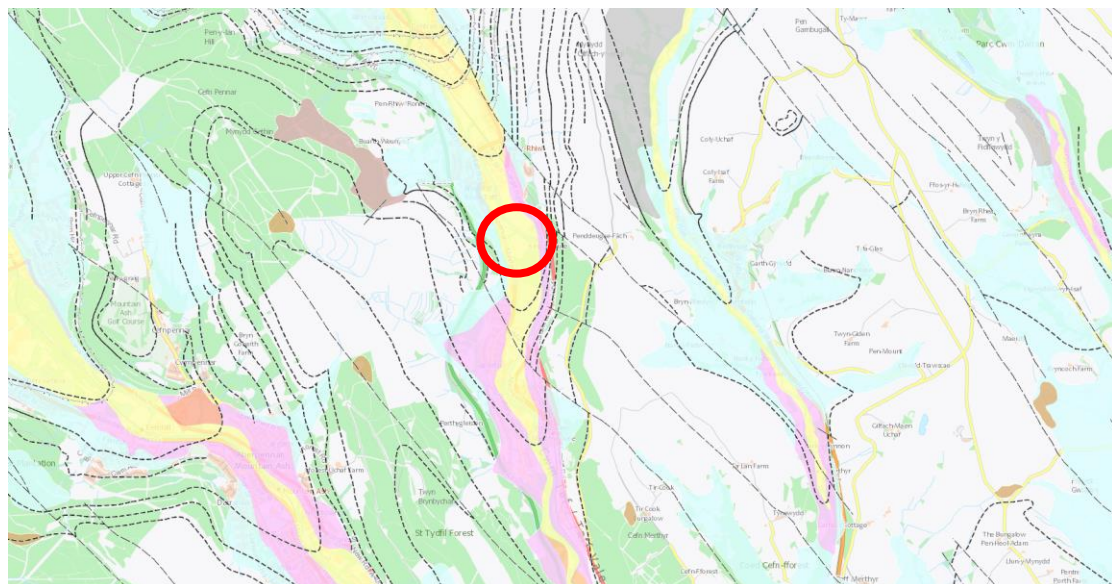


Figure 3.16 – Superficial Geology

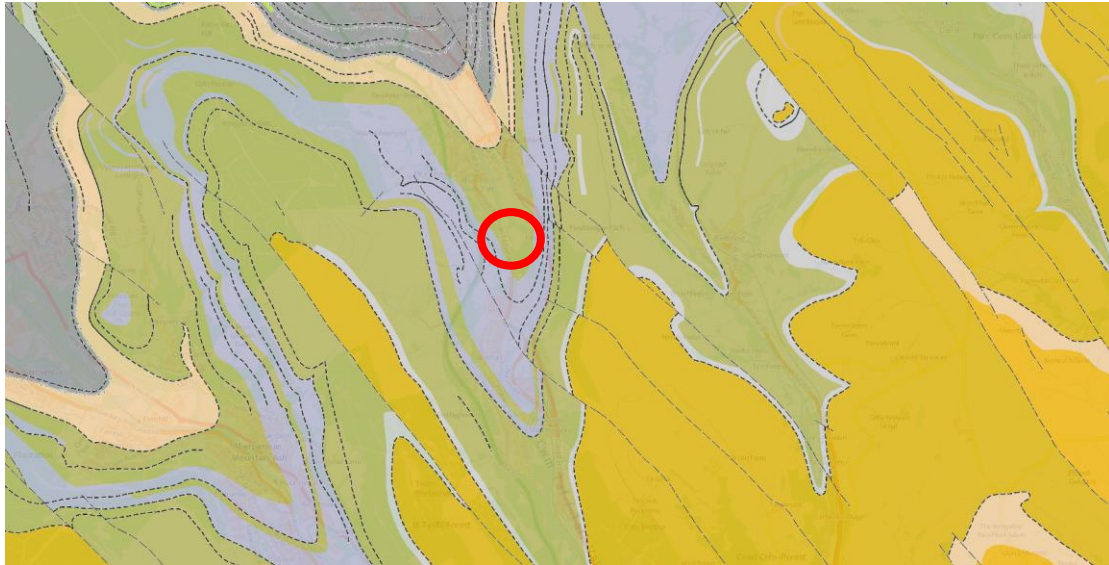


Figure 3.17 – Bedrock Geology

3.7 Historical Flooding

The site lies in an area that has been known to flood historically although the site itself may have remained flood free (see Figure 3.18).

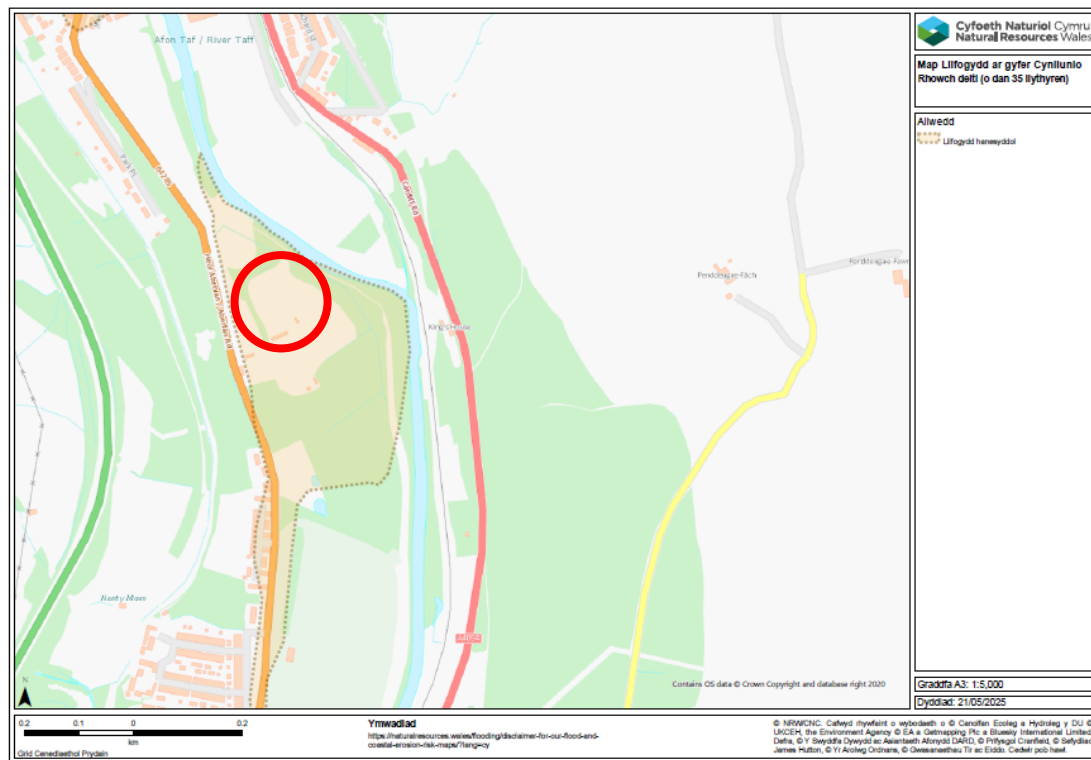


Figure 3.18 – Historical Flood Area

4 SUSTAINABLE DRAINAGE

A sustainable drainage solution, in accordance with the Welsh Government Standards and the SUDS Manual, should be incorporated into the design. SAB approval is also likely to be required which should be confirmed with the local authority.

The rain water falling on the roof of the day room will be stored for use, by means of a water butt, meeting the requirement of level 1 of Welsh Government sustainable drainage standard 1. It is expected that the overflow from the water butts, along with the remaining surfaces, will be dissipated using infiltration solution designed to accommodate the 1 in 100 year event plus climate change. This can be achieved by using a permeable surface (eg reinforced gravel) within the compound with an appropriate thickness of Type 3 subbase.

Plants can be placed around the perimeter of the compound to help absorb the water, enhance biodiversity and provide an amenity.

The proposed solution, which will need to be designed in detail, can be cost effective to construct and maintain. Appropriate measures will be undertaken during the construction phase, in accordance with the recommendations given in the appropriate Guidance for Pollution Prevention (eg GPP 6 Working at construction and demolition sites) to minimise the risk of polluting the nearby watercourse.

It is important that construction material, such as plaster, cement or even silt, do not impair or damage the integrity of the proposed drainage system. As such the SUDS system quite often will not come online until most of the construction work is completed. This could result in a temporary increase in the rainfall runoff rate, although being temporary it will not have an accumulative effect or be affected by climate change. Considering the size and the location of the development the likely impact will be low. Nevertheless, measures can be taken to reduce the rainfall runoff rate.

It is important also that the rainfall runoff does not wash contaminants from the site to any sensitive receptor. The contaminants could include:

- Silt, from when the ground becomes striped;
- Cement and grout;
- Oils and chemicals from construction materials and from plant;
- Fuel from plant (eg an excavator);
- Non Native Species that currently might be growing on the site;
- Construction waste.

Measures can be taken to minimize the risk as identified in Table 3 below:

Table 3 - Pollution Prevention Tasks	
Ref	Action
1	Where necessary place sandbags along the boundary of the site to help prevent silt from washing from the site into the road.
2	Ground is not to be stripped during periods of heavy rainfall.
3	All soil heaps to be covered.
4	The adjacent road will be monitored and, if necessary, periodically swept clean.

5	Grout/cement/concrete to be mixed in a designated location where the ground is protected.
6	Any waste to be disposed of in an appropriate receptor (eg skip) and taken off site to a licenced tip.
7	Used water, from washing tools used in working with cement (eg trowels) to be disposed of off site.
8	Where possible all chemicals will be stored off site. Any chemicals stored on site will be securely kept in a waterproof area and bunded where appropriate (eg using a hazardous substance storage cabinets).
9	Any cement kept on site will be stored in a secure waterproof area.
10	Ground protection will be present where chemicals are to be used and any spills are to be cleaned immediately using spill kits stored on site.
11	Site staff to be trained to use the spill kits.
12	Where possible plant will be fuelled off site. If this is not possible plant should be refuelled in a designated area where the ground is protected.
13	Prior to starting on site all workers will receive an induction training and advised of the chemicals used on site, where they are stored, pollution prevention measures to adopt, where the spill kits are stored and how to use them.
14	A waste minimisation audit will be undertaken prior to commencement on site. Where possible any residual waste will be recycled. All waste, however, will be cleaned immediately and placed in a covered collection receptor (eg a skip) and removed from site regularly.
15	Pollution incident response plan is prepared in accordance with current best practice (GGP21). An incident that could threaten the environment should be reported to NRW immediately on 0300 065 3000 (24hrs) .

5 FLOOD RESILIENCE

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 into the day room (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.

Generally, the finished floor level of the day room would be raised 150mm above the adjacent ground. In this instance, to ensure that the day room also remains flood free, even if the river defences fail, the finished floor level could be raised by 300mm.

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, generally, 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 5.1).

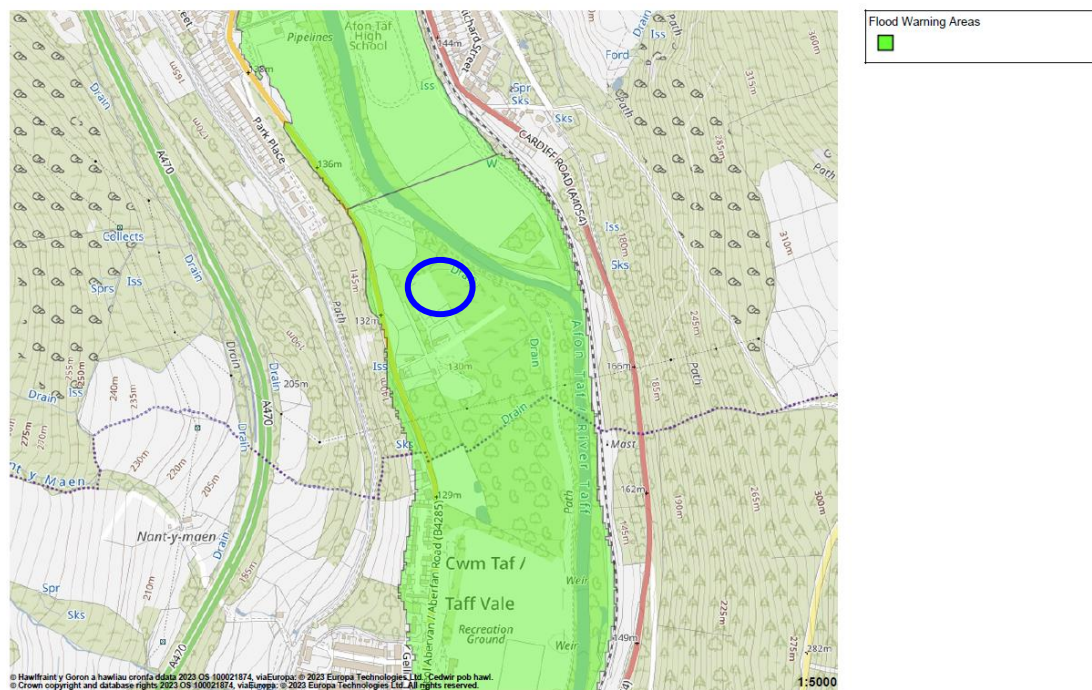


Figure 5.1 – NRW Flood Warning Area

Flood Response

Although the site is expected to remain floor free during a Q100 event potentially the site could remain at risk during an exceptional event.

The compound will subscribe to the Natural Resources Wales flood warning scheme, which uses the latest technology 24 hours a day to monitor rainfall, river levels and sea conditions. Combined with weather data and tidal reports from the Met Office, they can provide local area forecasts on the possibility of flooding and its likely severity.

Four different kinds of flood warning codes are issued. Three of the codes indicate the severity of the warning, and a fourth is an 'all clear', meaning the threat has passed. NRW ensure warnings are broadcasted on local radio and television, and information can also be obtained through their dedicated Floodline information service (0345 988 1188) or on their website, which is updated regularly when there is a flood risk.

The amount of warning that can be expected prior to an event depends on the source of the floodwater. A few days warning could be provided before a tidal event while only a few hours (or less) can be expected during a fluvial or surface water event. In some circumstances it may not be possible to provide a warning. In this instance, considering the size of the river and the catchment area warning of an event is expected although the length of warning may not be significant (hours).

A member of the family will be designated as a the flood leader / Flood Warden (the name is not important but it will be the person in charge of making flood related decisions particularly during an event) and other residents will be made aware who this person is. All the family and visitors will need to be made aware of the risk of flooding and the procedures in place in the event of a warning being received.

On arriving on site visitors will be made aware, via a notice, of the risk of flooding at the site (simple signage). When necessary, they will also be made aware of the procedures that are in place, and should be followed, if a warning is issued.

On receipt of a flood warning from NRW, all the family, and visitors, will be made aware that a warning has been issued and its severity. A decision will be made on whether to evacuate to a safe location, on higher land, or to remain on site. Prior to evacuating the compound all utilities will be switched off at the mains (electricity, water etc). No person will be allowed to return to the site until after the "all clear" has been given by NRW.

If, for whatever reason, water is seen to flow onto the entrance lane or road, preventing a flood free access route, then all should retreat to the static caravan or day room, which are expected to remain flood free, and stay until the flooding has dissipated. An emergency flood kit will be kept at the muster point and maintained on a regular basis. The kit will include a torch, radio, food, water, a first aid kit and family entertainment.

If it subsequently becomes necessary to leave the site during an event (eg medical emergency) then the emergency access route should be followed as displayed. The route will be south and overland to an access lane and subsequently west to the highway. The route will then be north to Troedyrhiw. It should be noted that the flood depth and velocity over sections of this route exceeds the values recommended in TAN 15.

A clear plan, showing the flood response procedure, is to be kept in a prominent position. The plan will be accessible to all to make them aware that the area is in a flood risk zone and what procedures are in place to safely evacuate the site.

This plan is to be reviewed as necessary, but at least annually, and is to be kept in good order

Evacuation Route

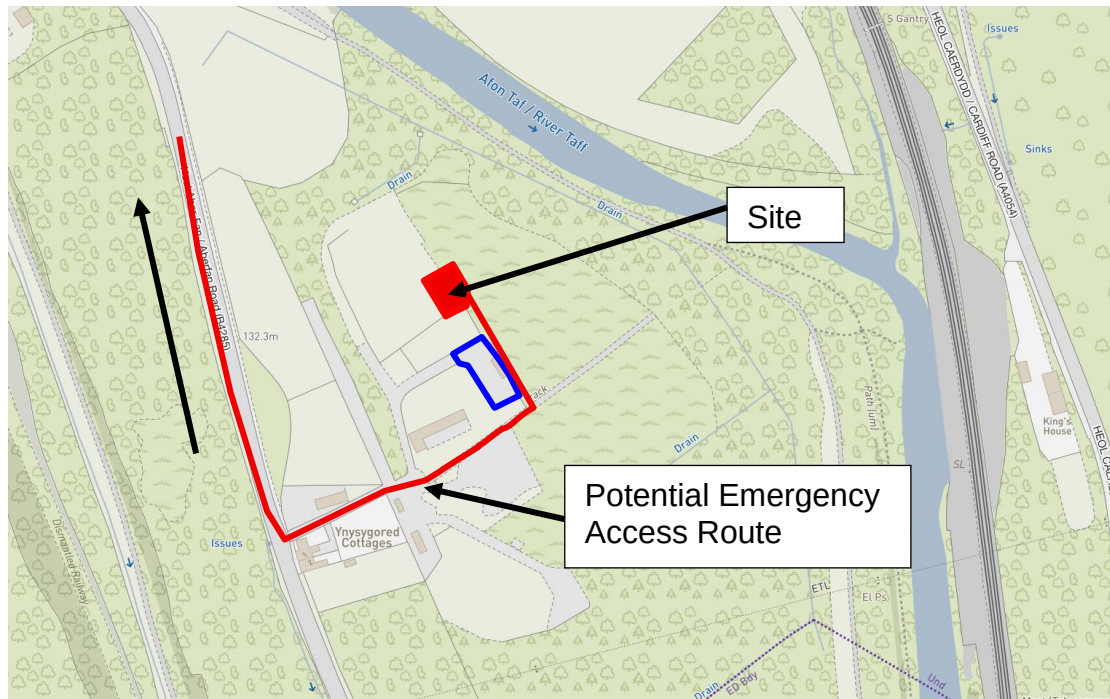


Figure 5.1 – Potential Emergency Evacuation Route

Flood response instructions

1 When a flood warning is issued to these premises, please advise the Flood Warden as named below:

Flood Warden _____

Work Hours Tel. _____

Out of Office Tel. _____

2 Ensure all present at the compound are aware that a flood warning has been issued, by Natural Resources Wales.

3 Flood door to the day room to be closed.

4 Prior to evacuating the site, all utilities are to be switched off.

5 In the event of flood water being seen on the access lane or highway refuge well be sought in the day room until the flood waters have dissipated.

6 Once evacuated, do not re-enter the area until instructed, by the recognised authority, that it is safe to do so.

7 If necessary, evacuate the site during an event by following the emergency access route.

6 CONCLUSION AND RECOMMENDATIONS

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

Conclusions

The client wishes to develop a highly vulnerable residential compound, which will include a dayroom and static caravan, on an existing storage yard adjacent to stables near Ynysgored Cottages, north of Aberfan. As required by TAN 15 the redevelopment must be allowed to adapt, change, and regenerate in the knowledge of what the science is showing. As such it is proposed that the compound is moved slightly to the north to higher land to provide betterment and to reduce the risk of flooding. The site, however, lies in a Zone 3 flood area, as shown on the Flood Map For Planning, and is considered at risk of flooding during a 1 in 100 year event with climate change. Francis Sant were, therefore, asked to undertake a Flood Consequence Assessment to evaluate the risk.

The study found that 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 NRW TUFLOW model also showed that the site is 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 at the site 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. Any loss would be further compensated by the removal of the existing storage yard.

The site is afforded a degree of protection from the river defences although even if the defences are removed the site would remain flood free during a Q100 event and the depth would be less than 200mm during a Q1000 event.

A Flood Response Plan should be prepared in case of an event to facilitate an evacuation if it is safe. If necessary, a flood free place of refuge is available in the day room or static caravan, even during a Q1000 event. If it is required to evacuate during a T1000 event (eg medical emergency) then an access route is available from the site to the highway and north to Troedyrhiw (see Flood Response Plan). Part of the route, however, will be subject to flooding.

A sustainable drainage solution, in accordance with the Welsh Government Standards and the SUDS Manual, should be incorporated into the design. SAB approval is also likely to be required which should be confirmed with the local authority.

A summary of the schemes compliance with TAN 15 is provided in Table 6.1.

Table 6.1 – Compliance With Tan15		
Ref	Criteria	
	What Zone does the development lie in?	Zone 3
	Vulnerability of the development?	Highly vulnerable
	Is the development located on greenfield or developed land?	Developed Land (Brownfield) although it will be moved to higher greenfield land
	Is the development flood free during a 1 in 100 fluvial or 1 in 200 tidal events?	Yes
	Is the flood depth less than 600mm during a 1 in 1000 year event?	Yes
	Is the velocity expected to be less than 0.15 for a highly vulnerable development or less than 0.3 for a less vulnerable development during a 1 in 1000 year event?	Yes
	Is there a safe access route?	The velocity and depth along the access route exceeds the recommendations of TAN 15 in areas
	Is the development at risk from costal erosion?	No
	Is the development in a defended zone?	No but is afforded a degree of protection from recognised defences.
	Is there a record of a previous flood event?	The site lies in an area that is recorded to flood even if the site itself remained flood free
	What is the flood hazard for the development?	Low
	Does the development have a detrimental impact on third parties' risk of flooding?	No

Recommendations

In developing the site, it is recommended that:

- the compound is moved to an area north of the existing developed site;
- the day room is raised 300mm above the ground levels ;
- flood proofing measures, as identified in Section 4, should be considered for inclusion in the scheme;
- consideration should be given for the inclusion of a non return valve on the foul sewer system;
- a sustainable drainage system should be included in the design;
- SAB approval should be applied for if required;
- the site is registered on the flood warning scheme provided by NRW,;
- a flood response plan is prepared, maintained and effectively disseminated to all future occupiers of the development.