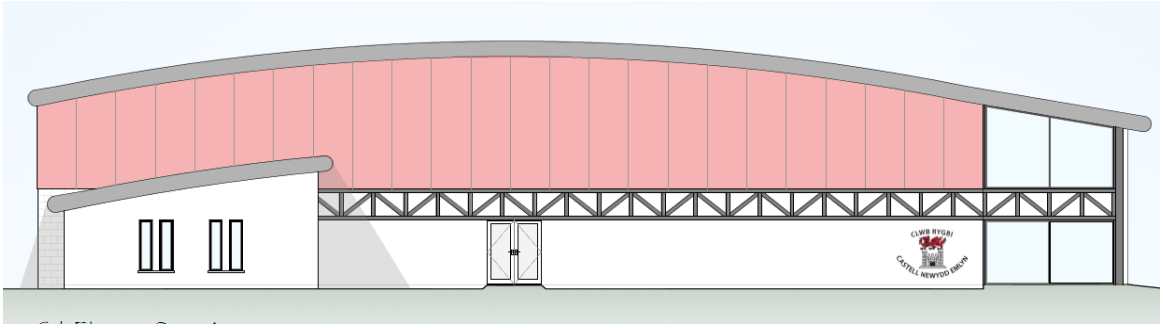
Francis Sant

Proposed Castell Newydd Emlyn RFC Training Barn
Flood Consequence Assessment Report



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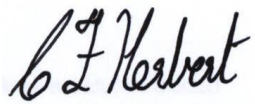
Signed ……  ……..……

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1 INTRODUCTION

It is proposed to build a sports training barn adjacent to the existing Castell Newydd Emlyn RFC clubhouse. Part of the development, however, may lie within a Zone C2 flood area, 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 building could be at risk of flooding during at least the 1 in 1000 year event and does not enjoy protection from significant and recognised flood defence infrastructure.

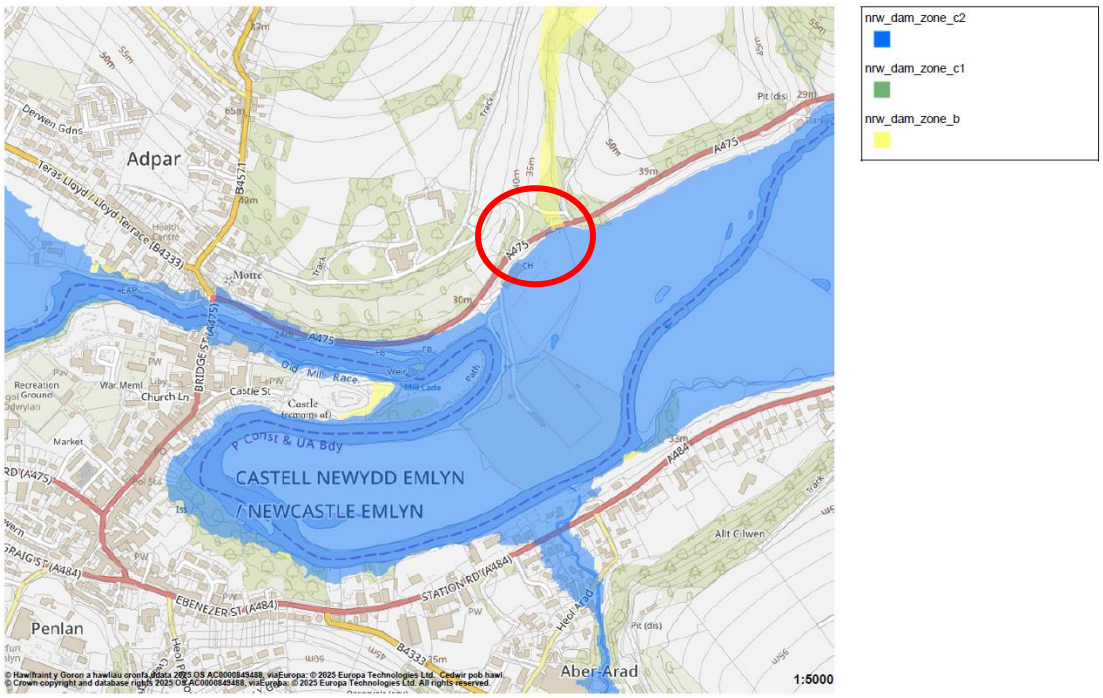

Figure 1.1 - Development Advice Flood Map

The development advice maps are based on Natural Resources Wales Flood Maps 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 Afon Teifi, and a small watercourse north east of the development, it is possible that the proposed building could be at risk from fluvial flooding, particularly when taking climate change into consideration. As such the client recognises the need for a Flood Consequence Assessment to 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 provides the location and nature of the development 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.

2 DEVELOPMENT

The proposed training barn (coordinates 231490 240980) is located adjacent to Castell Newydd Emlyn RFC club house in a rural location some 450m east of the town (see Figure 2.1 to 2.3 and Plate 2.1). The A475 highway is elevated to the rear of the proposed building while the Teifi is located some 220m to the south east and some 135m to the south west. There is a minor watercourse to the north east of the proposed building which is culverted at that point.

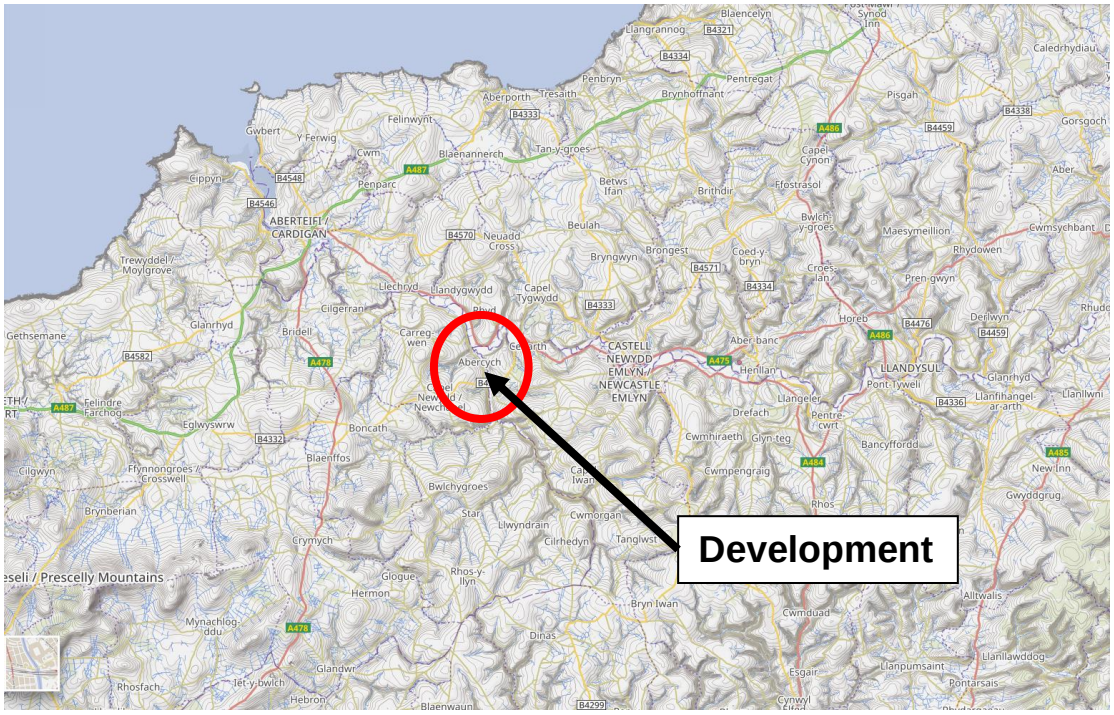

Figure 2.1 – Location Plan

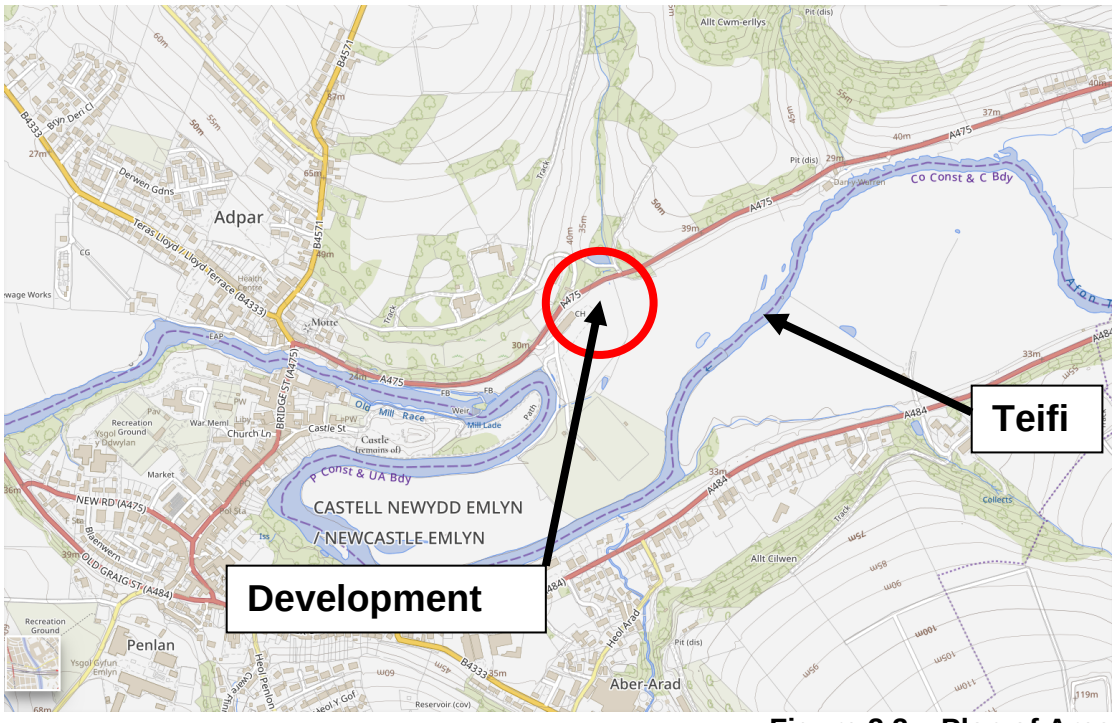

Figure 2.2 – Plan of Area

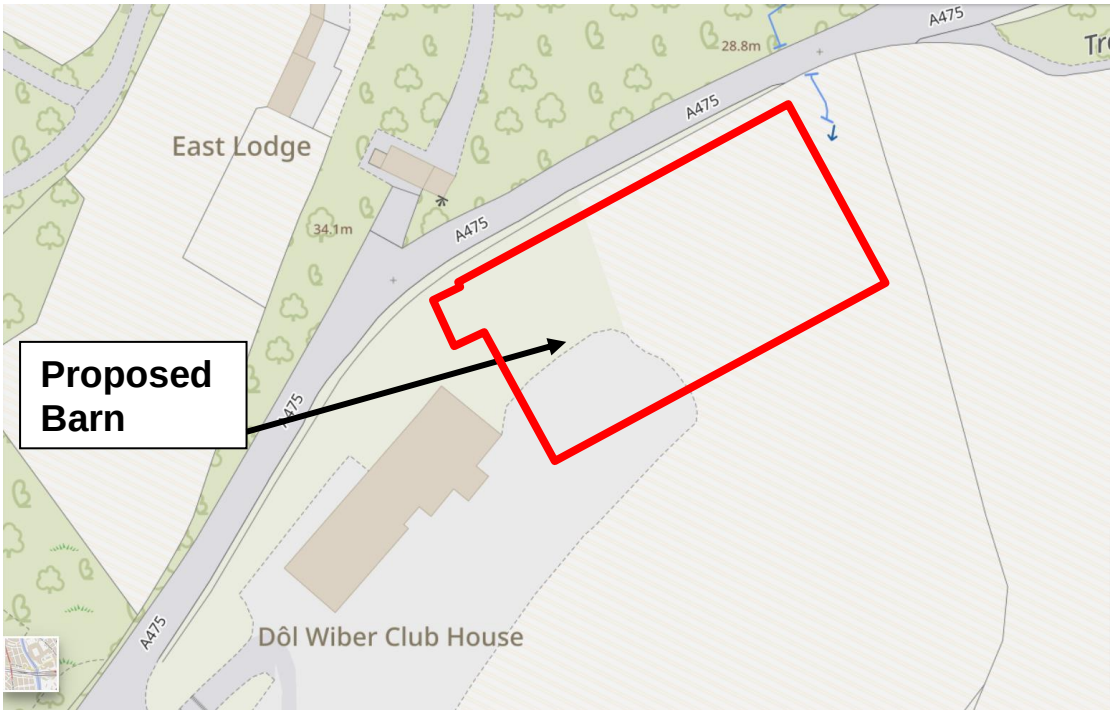

Figure 2.3 – Plan of Site

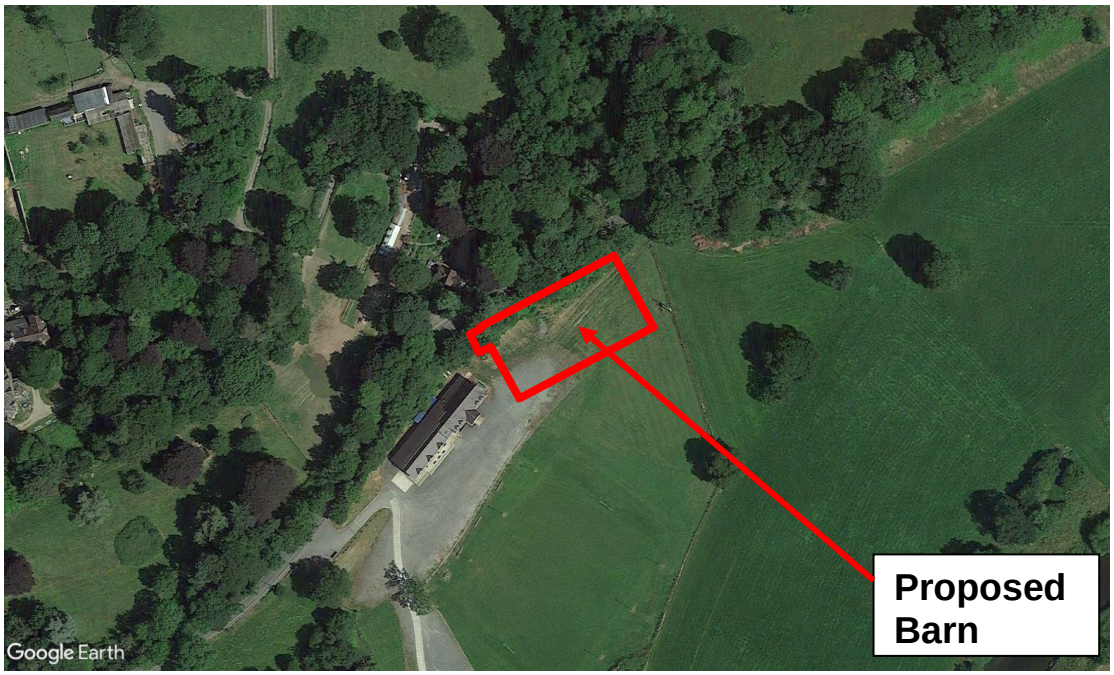

Plate 2.1 – Aerial View of Site

Proposed Development

It is proposed to construct a 64m x 30m training barn, complete with toilets, changing rooms and storerooms (see Figure 2.4 to 2.7). There will also be a first floor viewing gallery and function room

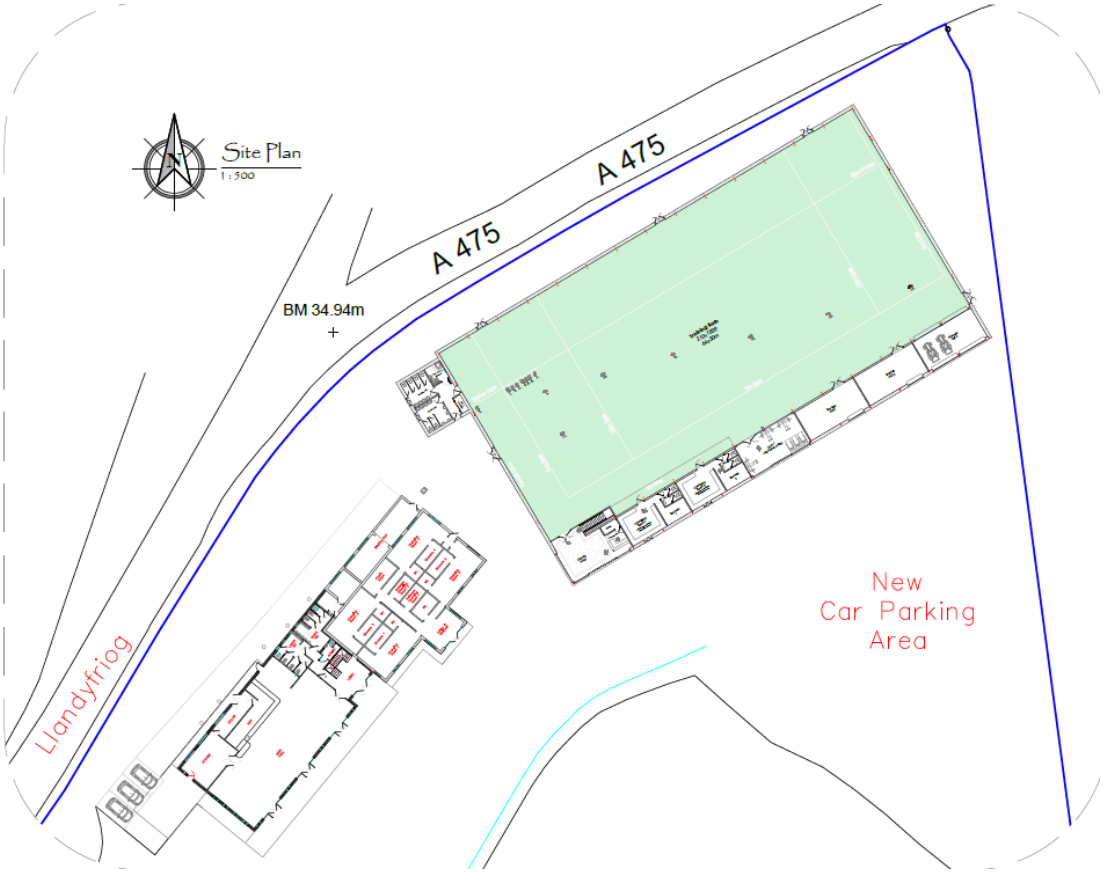

Figure 2.4 Plan of Proposed Site

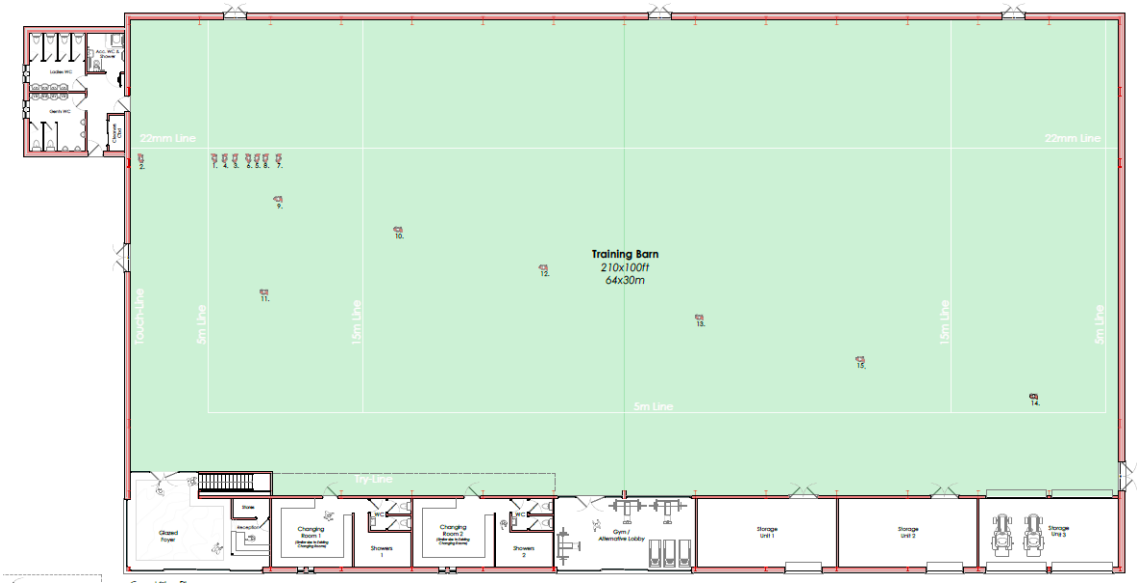

Figure 2.5 – Ground Floor Plan of Proposed Training Barn

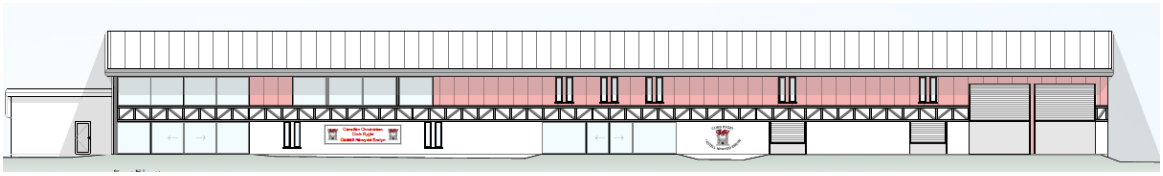

Figure 2.6 – Front Elevation of Proposed Training Barn

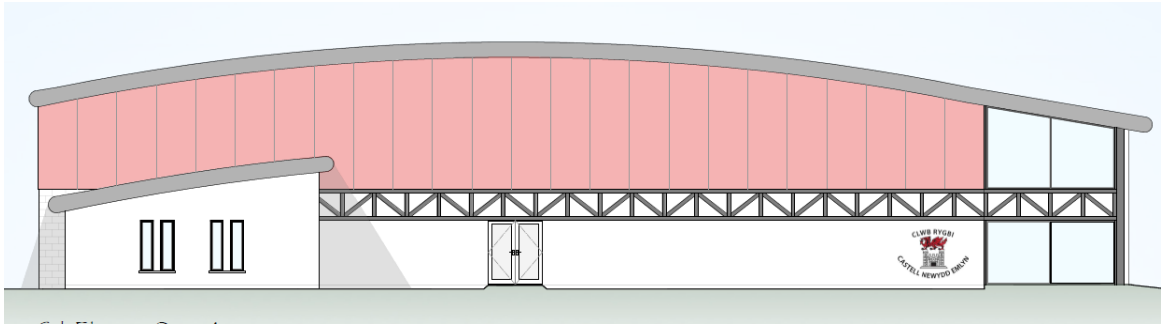

Figure 2.7 – Side Elevation of Proposed Training Barn

Topography

Lidar data for the area (see Figure 2.8) indicates that the ground levels under the footprint of the proposed development generally ranges between 27.4 and 28.2m AOD although the building might need to cut into the bank at the rear.

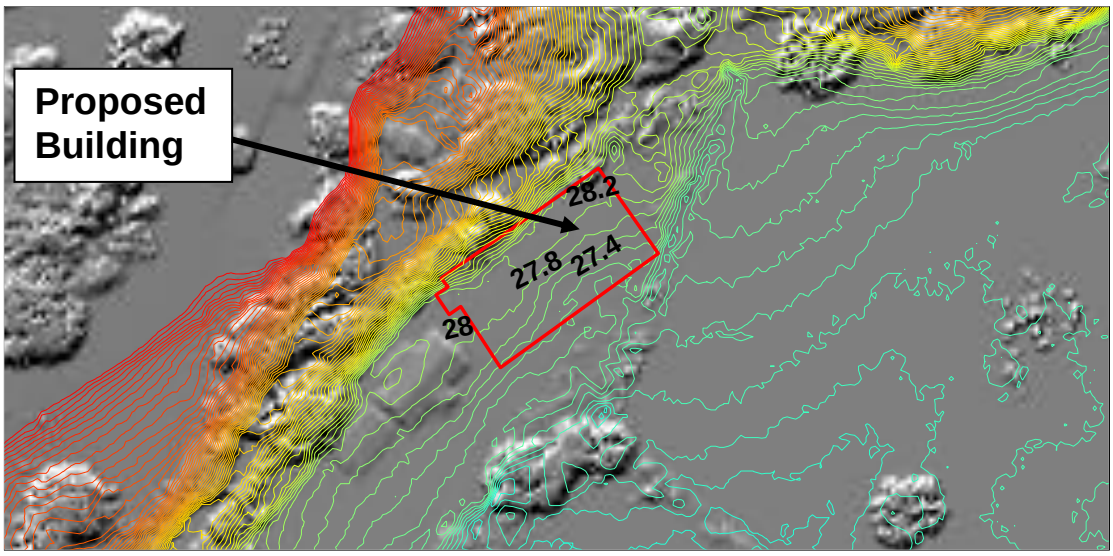

Figure 2.8 – Lidar Data for the Site

3 FLOOD RISK

Flooding can occur from several sources, some of which are considered in this section.

3.1 Fluvial

The Flood Map For Planning (see Figure 3.1), which takes climate change into consideration, shows that part of the proposed development is at risk of flooding from a fluvial source during the Q1000 event. A small part of the site also could be at risk during the Q100 event.

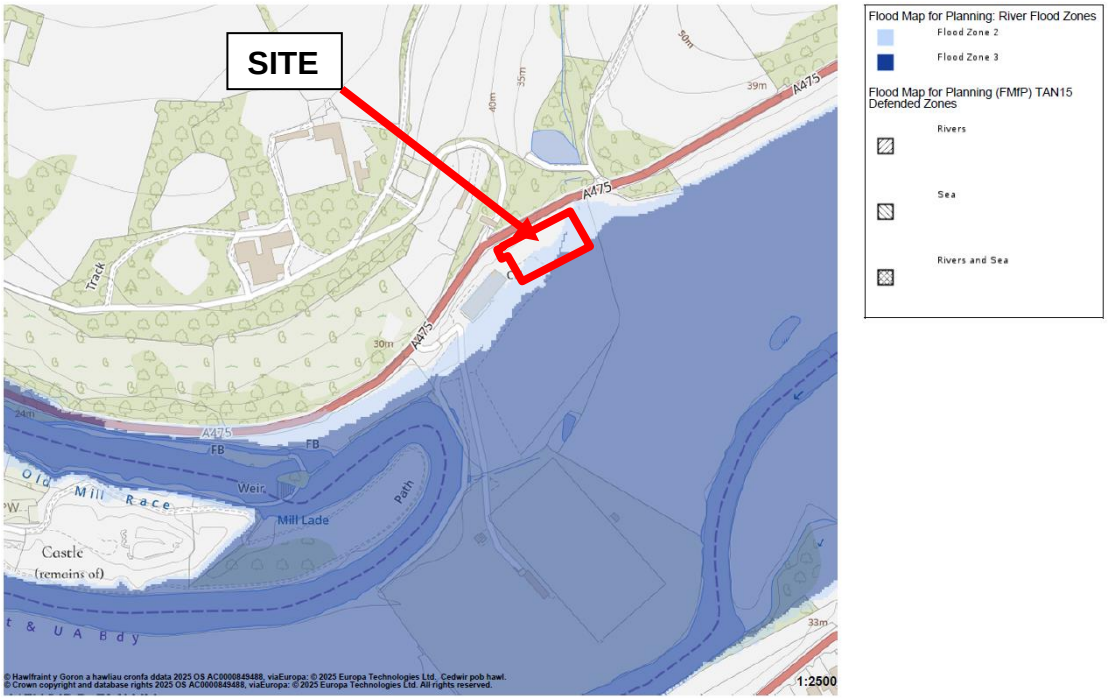

Figure 3.1 – River Flood Map For Planning

By examination, the Q1000 level can be taken as 27.9m AOD while the Q100 flood water could reach 27.3m AOD. To comply with TAN 15 the development should remain flood free during a Q100 and flooding should be manageable during the Q1000 (flood depth less than 600mm and velocity less than 0.15m/s). The finished floor level of the building should be set at Q100 plus 600mm but preferably at Q1000 plus 500mm.

Raising the finished floor level of the development will, however, potentially result in a slight loss of flood storage capacity, particularly during the Q1000 event. The volume nevertheless is minimal when considering the width of the floodplain in this area and the impact is not expected to extend beyond the clients land and is not expected to impact third parties.

If it becomes necessary to evacuate the building during an event then there is a flood free route onto the A475 from the rear of the building.

3.2 Tidal

The building is not considered to be at risk from tidal inundation.

3.3 Surface Water

The Surface Water Flood Map For Planning suggests that some water could flow across the footprint of the development during both he Q100 and Q1000 events (see Figure 3.2). The risk will increase should the culvert of the watercourse becomes blocked. It will be necessary, therefore, to channel the water around the building and allow it to flow across the field as it does currently.

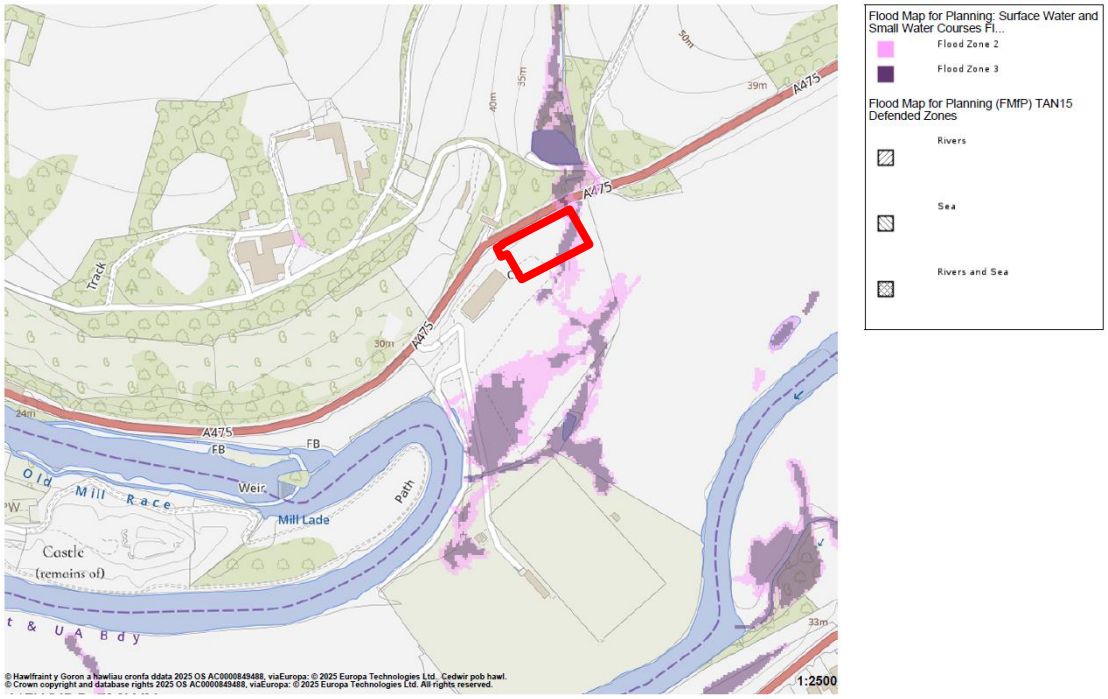

Figure 3.2 – 1 in 100 Year Surface Water Flooding Depth

3.4 Sewage Backflow.

Care should be taken to ensure that water from the foul / combined sewer system is unable to back up into the building and consideration should be given to installing a none return valve.

3.5 Sustainable Drainage

The sustainable drainage system will need to be designed in accordance with the Welsh Government Standards and the SUDS manual. As the development will be greater than 100m2 SAB approval will also be required.

3.6 Reservoir Failure

The site is not considered to be at risk of flooding from reservoir failure.

3.7 Ground Water

The superficial geology for the area consists of Gravel, Sand and Silt from Head, or Gravel, Sand, Silt and Clay from Alluvium, overlying a bedrock geology of Mudstone of the Nantmel Mudstones Formation (see Figure 3.3 and 3.4). When also taking the terrain into account the risk of groundwater flooding is considered to be moderate.

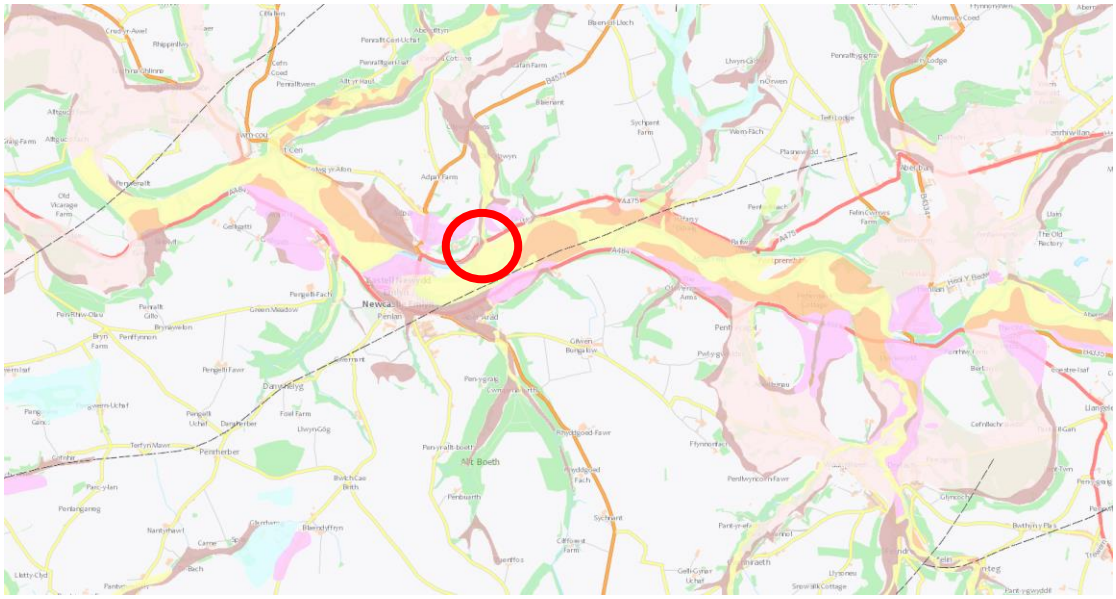

Figure 3.3 – Superficial Geology

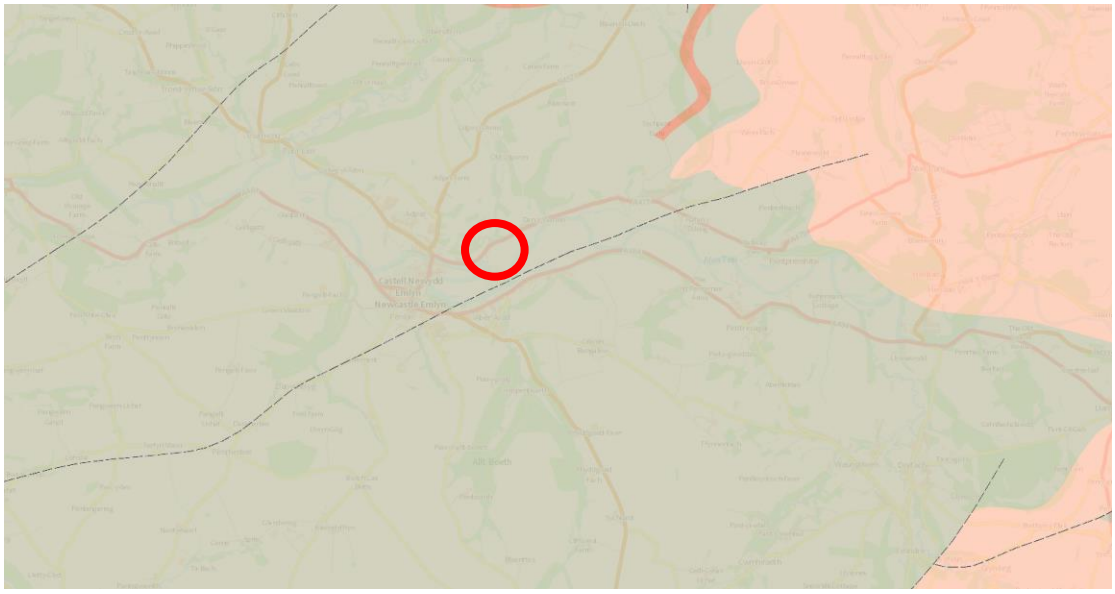

Figure 3.4 – Bedrock Geology

4 FLOOD PROOF MEASURES

Section 3 indicates that the ground floor of the development could potentially be at risk of flooding from a fluvial source. Flooding can result in the need for expensive repairs. As well as the direct damage caused to the building, flooding can impact in many other, and possibly more stressful, ways. The inconvenience of cleaning up the training barn, the loss of earnings and good will, while the business remains closed, can be significant. 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 for inclusion in the development.

Water can enter a building:

- Around the edges of closed doors;
- Through airbricks;
- Backflow through overloaded sewers;
- Seepage through walls especially cracks;
- Seepage through the ground;
- Around cable / services entrance into the building.

Dryproofing - Preventing the water from entering the building.
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 more appropriate to ensure that the walls of the building, including the rear boundary wall, 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. Alternatively, the air vents can be installed at a high level;
- 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 building can be raised above the Q100 flood level (plus freeboard) and preferably above the Q1000 flood level.

It may not be feasible to totally eliminate the risk of flooding, however, it is possible to limit the damage that the water can cause once in the building (wetproof). Where appropriate the following could be considered for the ground floor:

- Move valuable items to a higher level;
- Have solid concrete floors. Suspended floors are more difficult to clean and dry underneath;
- Use water resistant render for walls;
- Use non water absorbing insulation;
- Use corrosion resistant fittings such as galvanised or stainless steel;
- Ensure that the ground floor electrics are on a separate circuit to the first floor function room and balcony and that the electric cables are fed from above with the ground floor sockets kept high;
- Use an appropriate damp proof course;
- Consider freestanding movable equipment;

- Install equipment with motors high up from the floor;
- Install solid internal and external doors effectively sealed;
- Avoid storage heaters on the ground floor;
- Ensure boilers are off the ground.

A flood response plan should be prepared and regularly maintained. All future occupiers and patrons should be made aware of the flood risk and what actions are to be undertaken 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

Castell Newydd Emlyn RFC wish to construct a Training Barn adjacent to their club house. However, the less vulnerable building partially lies in a C2 flood zone, in accordance with the Development Advice Map, and hence an FCA is required to consider the consequences of flooding.

The River Flood Map For Planning shows that most of the development area remains flood free during a Q100 event although a significant (over 50%) part of the area could be affected during the Q1000 event. It is estimated that the Q100 flood level could reach 27.3m AOD while the Q1000 could reach 27.9m AOD. To ensure that the development remains flood free during a Q100 event, as required by TAN 15, the finished floor level should be set at 27.3m AOD plus a freeboard of 600mm (27.9m AOD) this would also ensure that the development remains flood free during the Q1000 event. These values take climate change into consideration.

Potentially the development could be affected by surface water flooding. It will be important, therefore as part of the design, to guide the water around the building and allow it to continue to flow across the fields as it is able to currently. This will prevent any detrimental impact to third parties.

The development is not expected to be at risk from tidal flooding or flooding from reservoir failure. There is, however, a medium risk from ground water flooding.

As a less vulnerable development (as identified in the revised version of TAN 15) the development can be considered acceptable at the proposed location subject to it meet the justification tests provided in section 6 of TAN 15. While it is for the Planning Authority to decide whether the scheme meets its planning objectives, in terms of the criteria contained in section 5, 7 and appendix 1 of TAN15, it is considered that the proposals are acceptable.

Flood proofing measures can be installed to reduce the risk of flood water ingress and to minimise the impact, should water enter the building.

A sustainable drainage system will be required, designed in accordance with the Welsh Government Standards and the SUDS Manual. As the development will be greater than 100m2, SAB approval is likely to be required.

Recommendations
In developing the site, it is recommended that:

- the finished floor level is set at 27.9m AOD or above;
- external flood doors are installed;
- flood proofing measures, as identified in Section 4, are included in the development where possible;
- an emergency evacuation plan is prepared, maintained and effectively disseminated to all future occupiers;
- the development is registered on the flood warning scheme provided by NRW;
- surface flood water, from the watercourse to the rear, is guided safely around the building and allowed to discharge over the fields as it does currently.