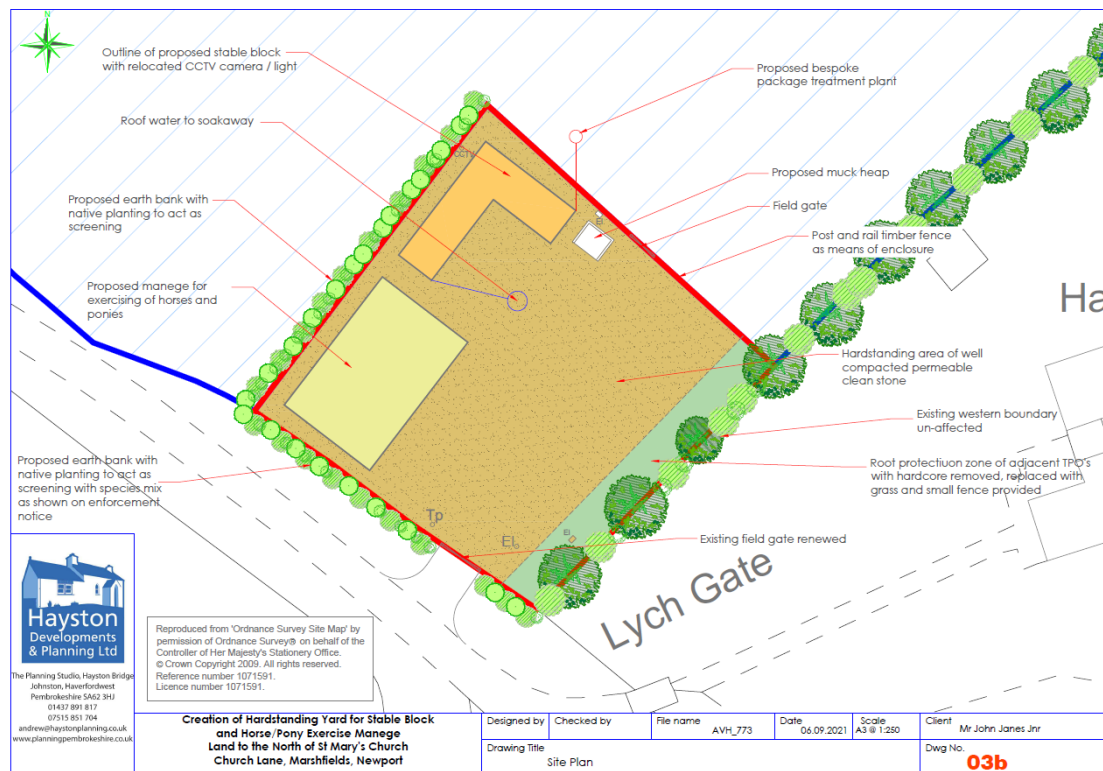


Francis Sant

Development Of Stables and Manege, Adjacent to St Mary's Church, Marshfield, Newport Flood Consequence Assessment Report

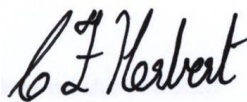


November 2021
Final

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Signed



Date

November 2021

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1 INTRODUCTION

It is proposed to construct a stable block and manege on a site adjacent to St. Mary's Church, Marshfield, Newport. The proposed site, however, is located partially within a C1 flood zone on the Development Advice Maps and in defended Zone 3 on the new Flood Maps For Planning (see Figure 1.1 and 1.2). The maps are referred to, and the zones are defined respectively in the current and proposed Technical Advice Note 15, Development and Flood Risk (TAN 15). This means that part of the site could be at risk of flooding at least during the 1 in 1000 year event and during the tidal 1 in 200 year event, when taking climate change into consideration. The site is, however, afforded protection from significant and recognised flood defences.

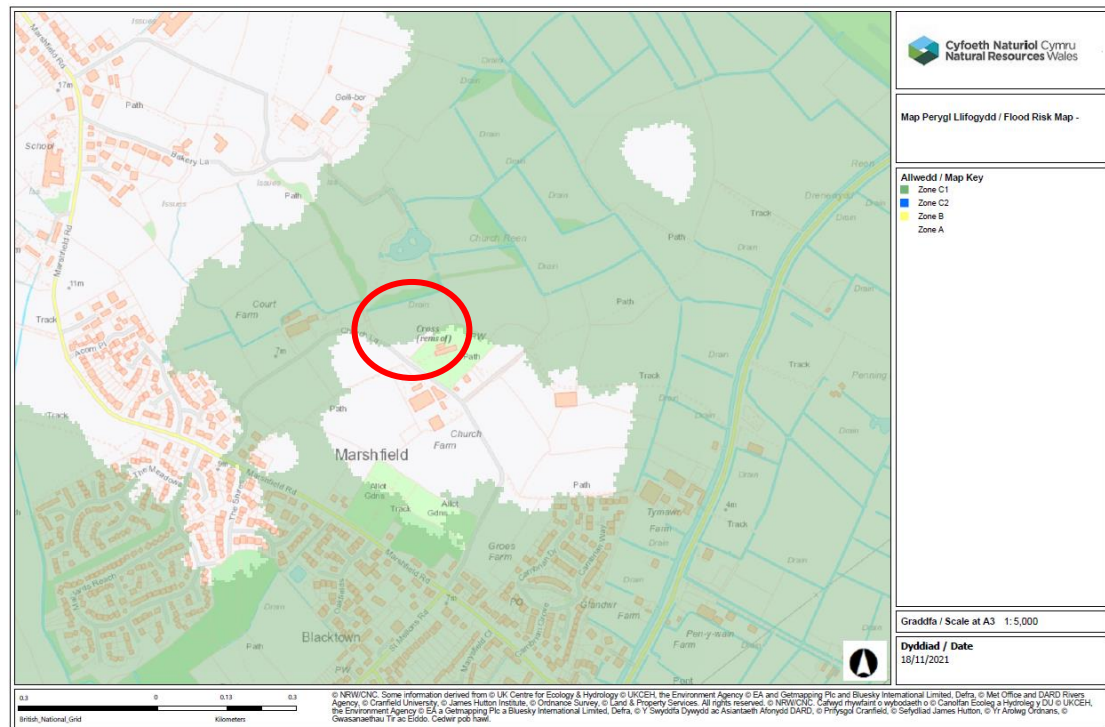


Figure 1.1 - Development Advice Flood Map

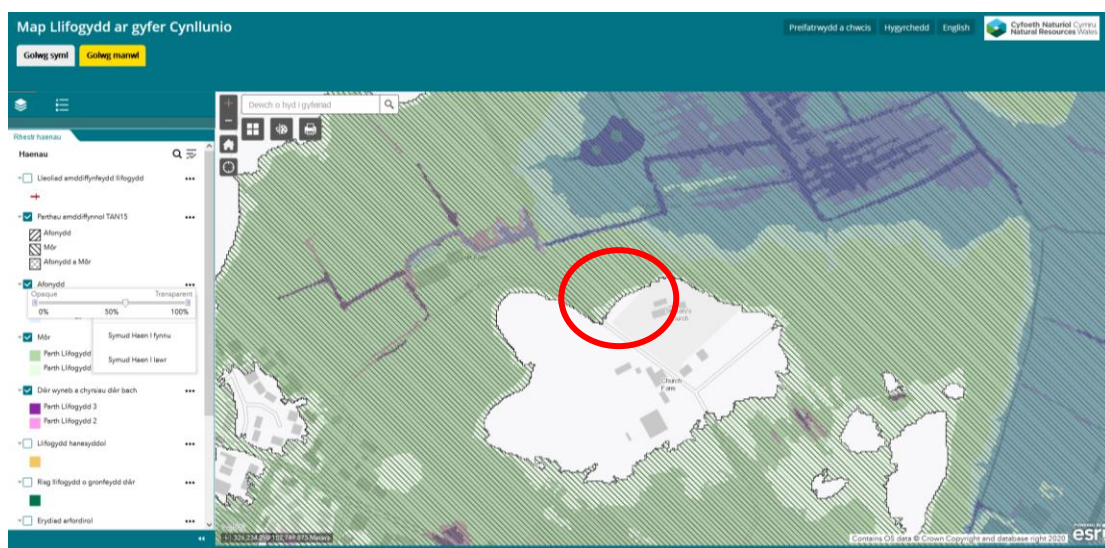


Figure 1.2 - Flood Map For Planning



Figure 2.3 – Plan of Site

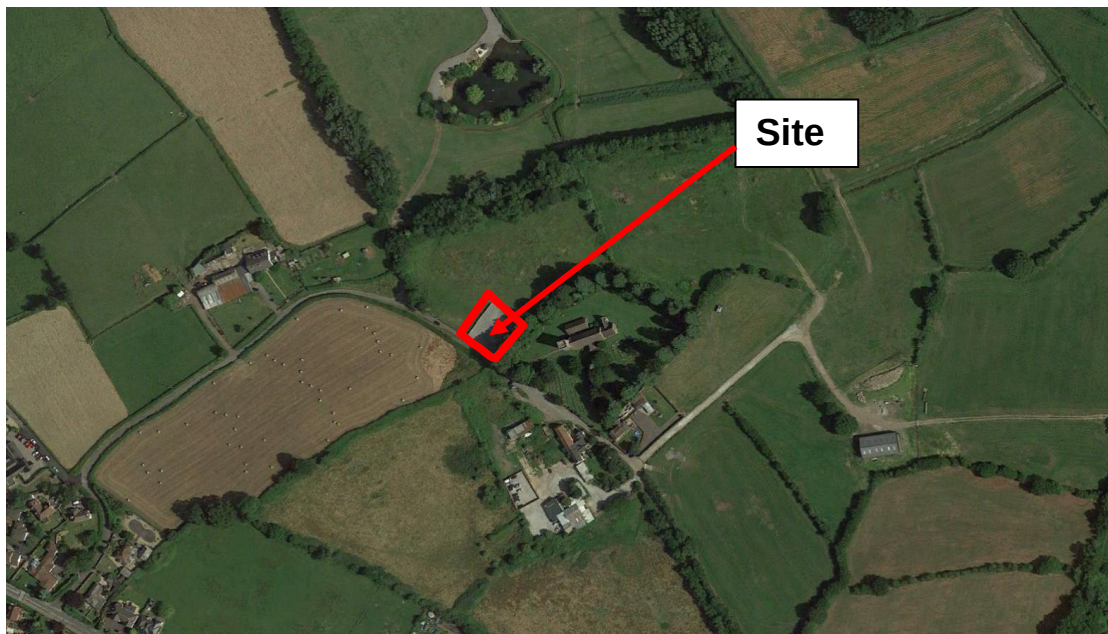


Plate 2.1 – Aerial View of Site

Proposed Development

It is proposed to build a manege and a stable block consisting of 4 bays, a tack room and a toilet (see Figure 2.4 and 2.5).

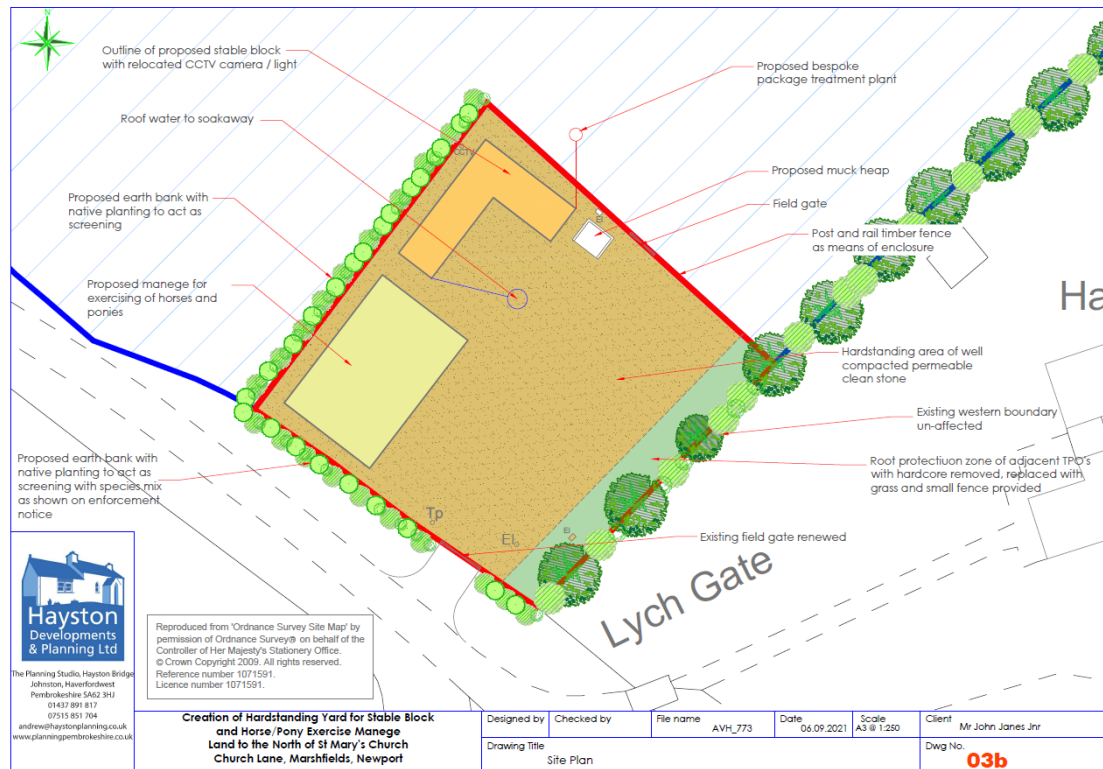


Figure 2.4 – Plan of Proposed Development

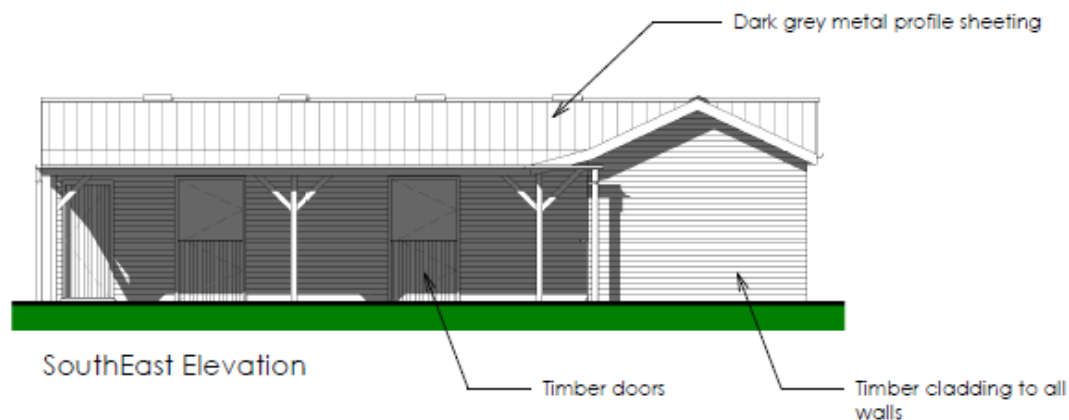


Figure 2.5 – South East Elevation Of proposed Stables

Topography

Lidar data (see Figure 2.6) shows that the site ground levels range between 8.4m AOD and 10m AOD with the land generally falling from south to north.

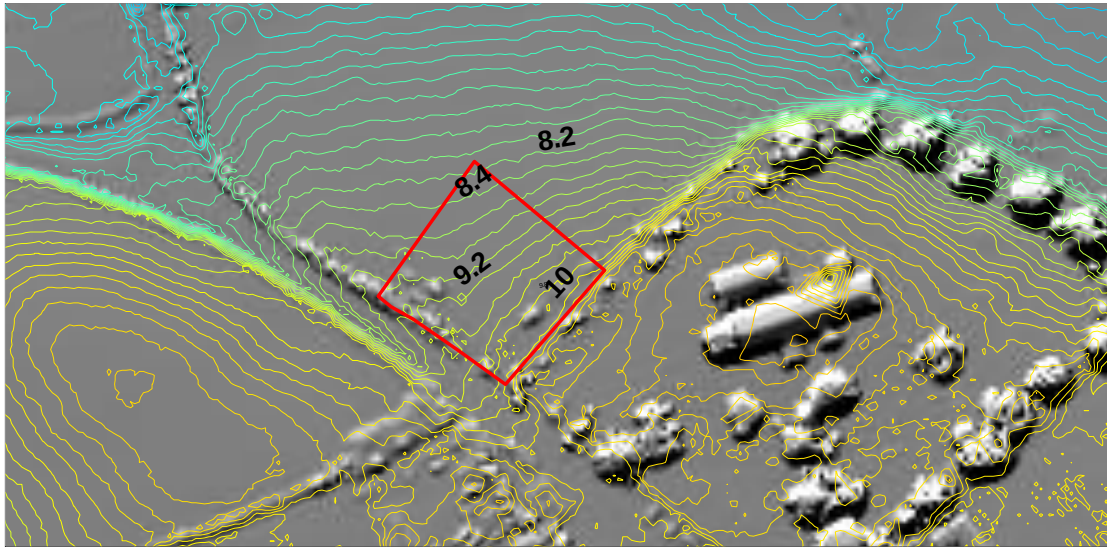


Figure 2.6 – Lidar Data for the Site

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 currently most of the site is expected to remain free from flooding although the northern corner could be affected during the T1000 event. The site is, however, afforded protection from recognised defences. These maps don't take climate change into consideration.

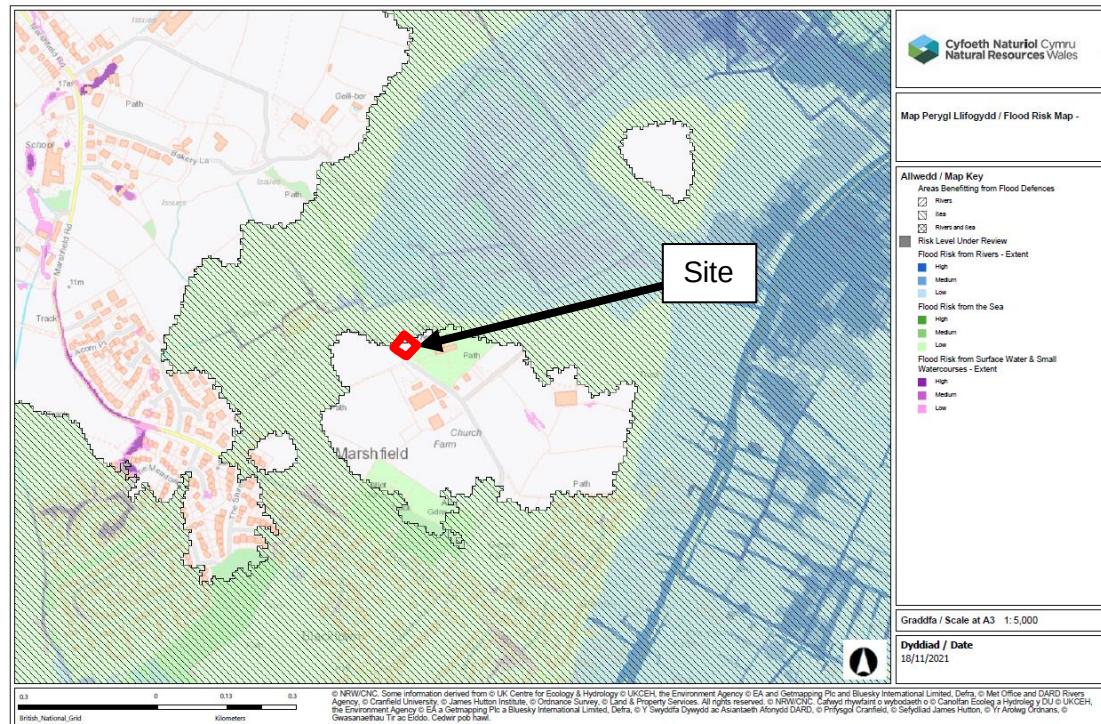


Figure 3.1- NRW Flood Map of the Area

3.1 Fluvial

The new detailed Flood Maps for Planning shows that the site is expected to remain free from fluvial flooding during at least the Q1000 event, even when taking climate change into consideration (see Figure 3.2). It is noted that Church Reen, some 50m to the north, is affected.

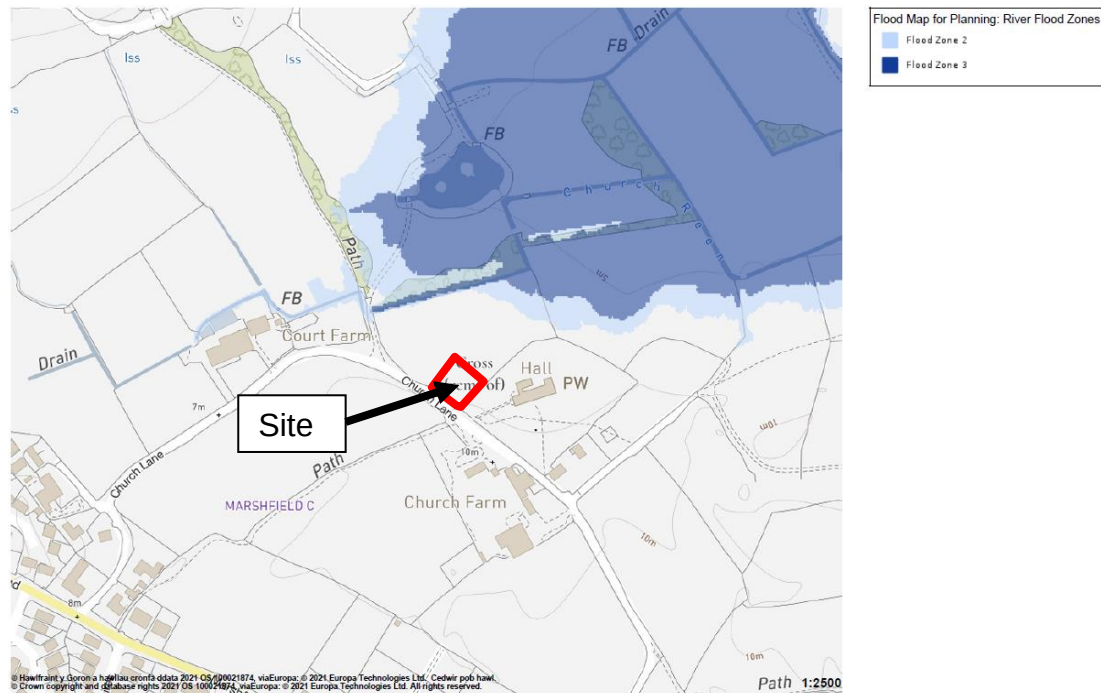


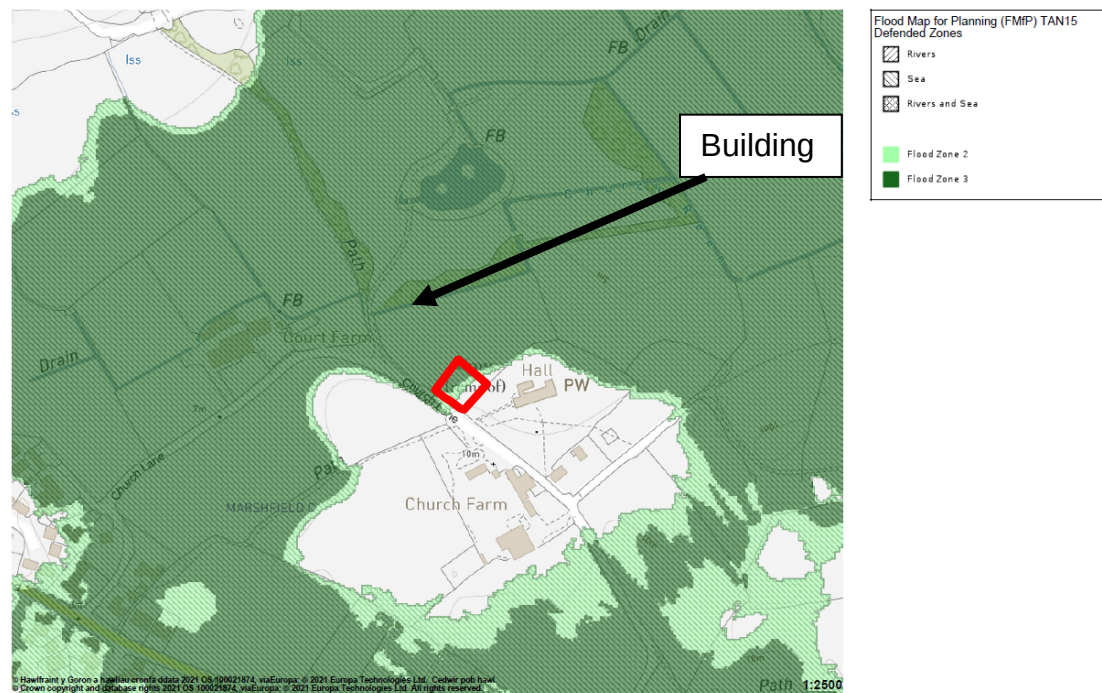
Figure 3.2 – Fluvial Flood Map For Planning

3.2 Tidal

The new Tidal Flood Maps For Planning would suggest that the site lies in a tidal flood Zone 3 and potentially at risk during a T200 event but is afforded protection from recognised defences (see Figure 3.3). In examining this further the method promoted in the coastal flood boundary conditions (for UK mainland) research project, as amended (2018), is used to determine the T200 and T1000 high tide levels. This accounts for the joint probability of meteorological (surges etc) and astrological effects (the impact of the sun and the moon) on the tide. The levels for the adjacent coastline for the T200 and T1000 events were obtained (see Table 3.1 - base year 2017). The levels have a 95% confidence level although the precautionary levels, with a 97.5% confidence of non-exceedance, are also considered.

In addition, recommendations from NRW suggest that the current tide levels should be increased by 100 years of sea level rise for a new highly vulnerable development (eg residential developments) and by 75 years of sea level rise for a new less vulnerable development. The derived T200 year and T1000 year levels, using the above approach, are provided in Table 3.2.

Table 3.1 - Water Surface Extreme Tide Elevation (m AOD)			
T200 (0.5%)		T1000 (0.1%)	
Level	97.5% Confidence	Level	97.5% Confidence
8.110	8.570	8.450	9.330



3.3 Surface Water

The surface water Flood Map For Planning (see Figure 3.4) suggests that the site is not at risk of flooding from surface water flooding. The site is elevated above much of the surrounding land and standard precautionary measures are expected to be sufficient to prevent flooding from this source.

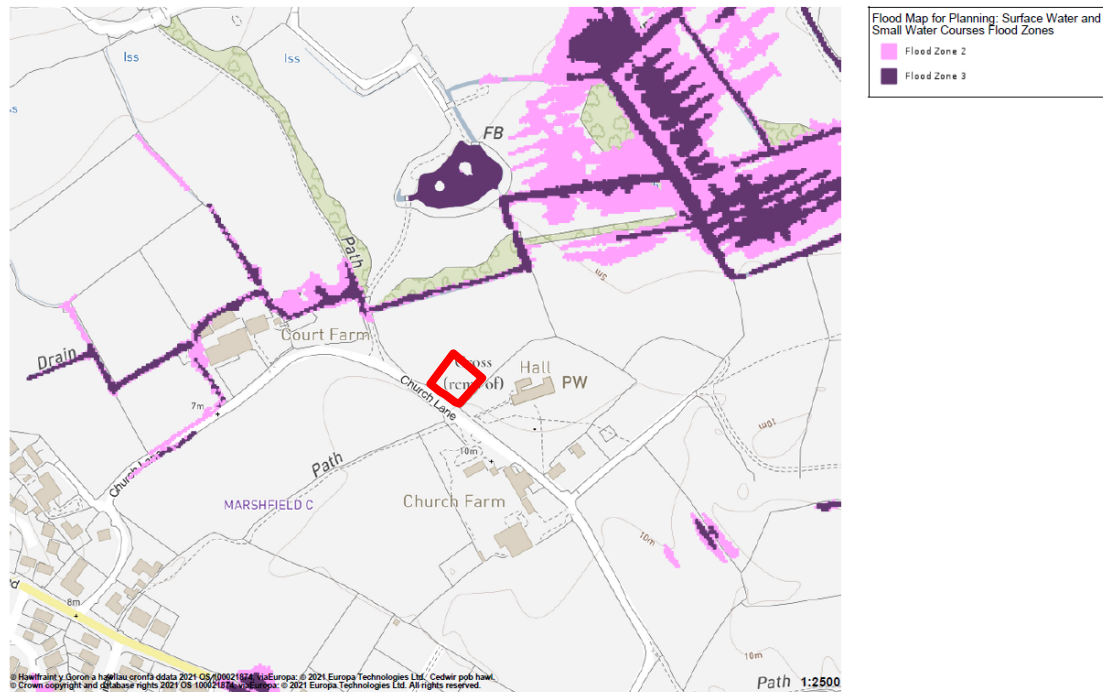


Figure 3.4 – Surface Water Flood Map For Planning

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 site.

3.5 Sustainable Drainage

Sustainable drainage systems will be designed into the proposals and SAB approval will be applied for. The manege will be constructed using permeable material while the roof of the stable will initially be drained into water butts allowing the water to be used for cleaning. Overflow from the stable will be drained by infiltration, however, if this is not possible it will be drained into a nearby watercourse at a greenfield runoff rate with the water being attenuated in a swale. Sediment will be removed from the swale and the catch pit of the control chamber as necessary.

3.6 Reservoir Failure

The development is not considered to be at risk from reservoir failure.

3.7 Ground Water

The superficial geology for the area consists of Diamicton from Devensian Till overlaying a bedrock geology of Interbedded Argillaceous Rocks and Sandstone of the St Maughans Formation (see Figure 3.5 and 3.6). When also taking the terrain into account the risk of groundwater flooding is considered to be low.

4 FLOOD PROOF MEASURES

Section 3 indicates that the development could be at risk from tidal flooding when climate change is taken into consideration and assuming the defences fail. 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 a site, the loss of valuable items and the potential loss of valuable animals 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 as part of the development where applicable.

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.
- Providing temporary covers to any low air vents. These covers should be removed once the risk of flooding is over.
- Erecting a temporary barrier in front of any external doors of the buildings or installing flood protection doors;
- Installing a valve allowing the sewer system to be shut preventing any back flow.

In this instance the most effective way forward is to ensure that the ground level of the is either raised above the T200 flood level, taking 75 years of sea level rise into consideration or located land above this level. As an open recreational area flooding of the manege is not considered an issue.

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

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

- Move valuable items to a higher level;
- Have solid concrete floors. Suspended floors are more difficult to clean and dry underneath;
- Use block construction with water resistant render for walls;
- Use non water absorbing insulation if required;
- Use corrosion resistant fittings such as galvanised or stainless steel;
- Ensure that, if installed, the electric cables are fed from above with the sockets kept high;
- Use an appropriate damp proof course;
- Consider freestanding movable equipment;
- Install solid doors effectively sealed.

A flood response plan should be prepared and regularly maintained. All future occupiers and visitors 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).

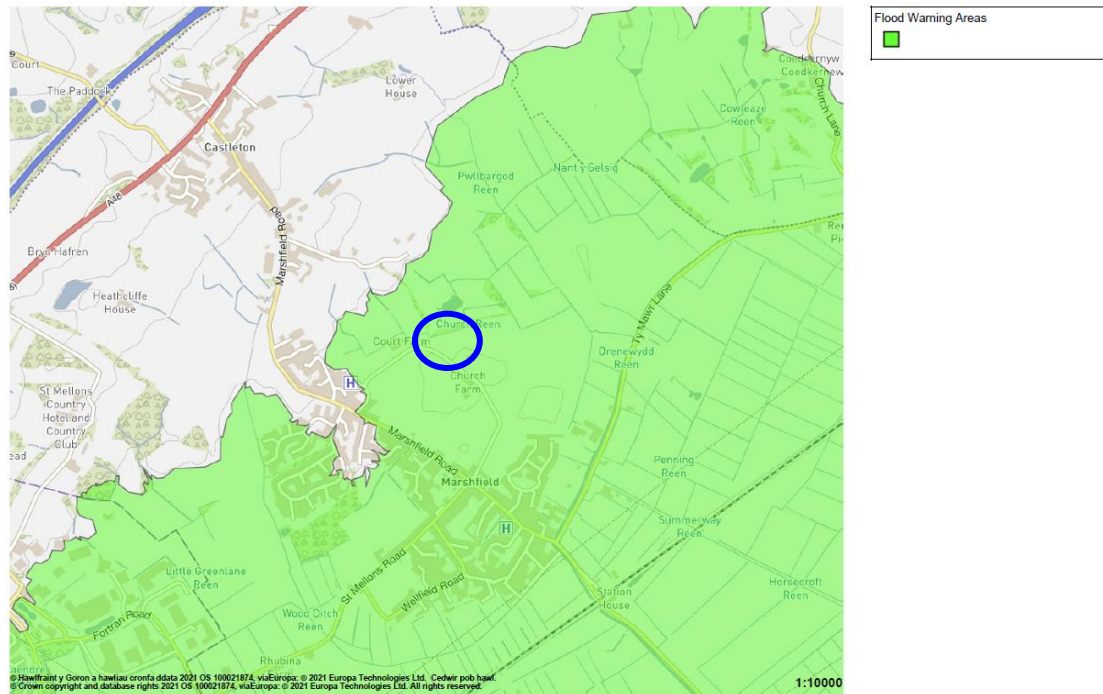


Figure 4.1 – NRW Flood Warning Area

5 CONCLUSION AND RECOMMENDATIONS

It is proposed to erect a manege at a site adjacent to St Mary's Church, Marshfield, Newport. However, the client has been advised that the site partially lies within a C1 flood zone, in accordance with TAN 15, and within a defended Zone 3 flood zone on the proposed Flood Map For Planning. Francis Sant have, therefore, prepared a Flood Consequence assessment to consider whether a Less Vulnerable Development is acceptable at the considered location.

The NRW Flood Risk Assessment Maps indicate that the site is expected to remain free from fluvial and surface water flooding even during the Q1000 event. While tidal water could reach a small section of the site the maps show that the area is afforded protection from such a source. However, the maps do not take climate change into consideration. The fluvial Flood Map For Planning (which takes climate change into consideration) also considers that the site is expected to remain flood free during a Q1000 event as does the equivalent surface water flood map. The tidal Flood Map For Planning, however, indicates that the site partially lies in flood Zone 3 but is afforded protection.

Further investigation showed that the T200 and T1000 flood levels, with 75 years of sea level rise, reached 8.886m and 9.226m AOD respectively or 9.346m and 10.106m AOD when considering precautionary values. The site is considered to be defended against the T200. Site levels generally range between 8.4m and 10m AOD. For the development to be considered acceptable it should remain flood free during a T200 event. It will, therefore, be necessary to locate the stable on land above the T200 tide level ensuring that it remains flood free during such occasions and manageable during the T1000 event. During the T1000 the flood depth at the stable will be less than the 600mm which is allowed in the revised TAN 15 and, as this would occur at the top of the tide, the flow velocity is expected to be low.

SUDS will be incorporated into developments design and SAB approval will be applied for.

The site is not considered to be at risk from reservoir failure while the risk from ground water flooding is considered to be low.

Recommendations

In developing the building, it is recommended that:

- The stable are constructed on land above a minimum of 8.9m AOD.
- Wet proofing measures, as identified in Section 4, are included in the development where possible.
- A flood response plan is prepared, maintained, and effectively disseminated to all future occupiers and visitors.
- The property is registered on the flood warning scheme provided by NRW.