



FLOOD CONSEQUENCE ASSESSMENT

Static Caravan to Rear of
Ynysygored Cottages, Aberfan

Mr Norman Stephens
9858-REP01-R0-FCA

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CLIENT: Mr Norman Stephens

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0 INTRODUCTION

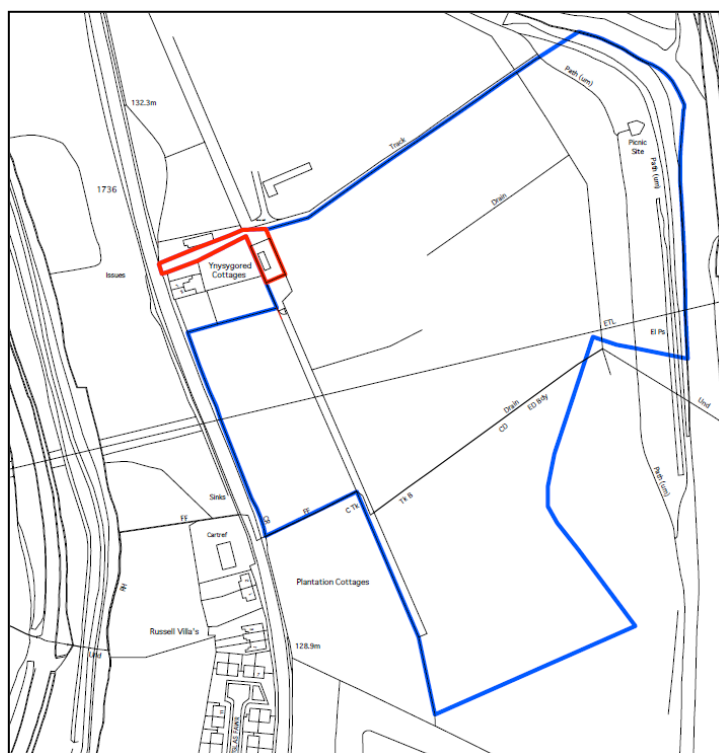
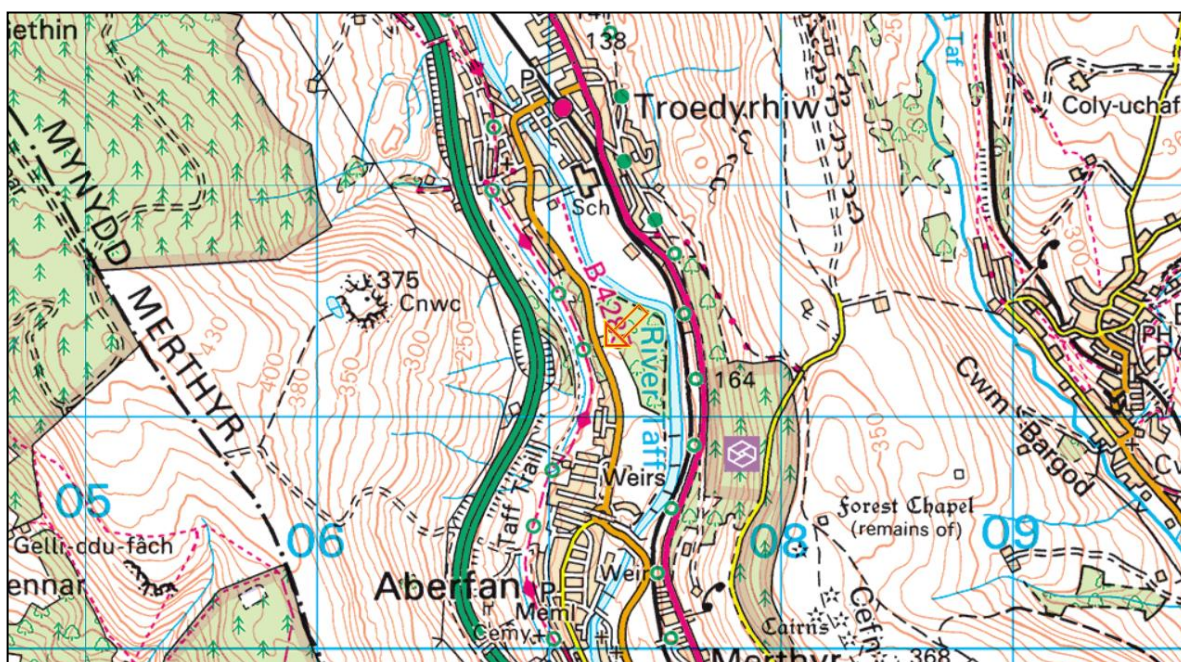
- 0.1 It is proposed to site a static caravan on land to the rear of Ynysygored Cottages, Bronheulog Terrace, Aberfan which would be occupied for residential use.
- 0.2 Guidance within Planning Policy Wales and Technical Advice Note (TAN) 15 prescribes a minimum standard of flood protection for any new development within flood risk areas. Mapping is based on Natural Resource Wales' extreme flood outlines (Zone C) and British Geological Survey drift data (Zone B). Zone B data originally published in 2004, updated in 2017 and Zone C data revised quarterly.
- 0.3 The site is located within Flood Zone C1 and is therefore recognised as an area which, whilst located within the flood zone, benefits from significant infrastructure including flood defences. As a residential property, the end use is considered 'highly vulnerable' in accordance with TAN15 Section 5, Figure 2.
- 0.4 This Flood Consequence Assessment (FCA) is intended to support the development's planning application and follows the numbering of the seventeen points listed in paragraph A1.17 of TAN15 Appendix 1 with relevant site specific information on the development and its setting described under the appropriate headings.
- 0.5 This assessment is based on a topographical survey commissioned specifically for this development. Base mapping used in some drawings contains Ordnance Survey data, © Crown copyright and database right 2020.
- 0.6 This report contains information supplied by NRW and subject to their respective copyright and database right (referenced ATI-19828a).

1 THE SITE

1.1 Site Location

- 1.1.1 The development site is located on the side of the steep Merthyr Valley to land at the rear of Ynysygored Cottages, off Bronheulog Terrace, Aberfan.

Figure 1.1 – Site Location



1.1.2 The site is bound to the west by the residential properties Ynysgored Cottages and Bronheulog Terrace beyond. Land to the north, south and east is largely vegetated greenfield / floodplain. It is accessed off Bronheulog Terrace via an existing access track.

1.1.3 The site is centred at approximate Ordnance Survey co-ordinates E: 307303, N: 201323.

1.2 Main Watercourses

1.2.1 The site is located approximately 250m west of the River Taff which is a designated main river which lies under the jurisdiction of Natural Resources Wales (NRW).

1.3 Flood Zone Classification

1.3.1 The development site is wholly located within Flood Zone C1 and is therefore recognised as an area which, whilst located within the flood zone, benefits from significant infrastructure including flood defences.

Figure 1.2 – Development Advice Map (DAM)



1.3.2 With residential occupancy proposed, the end use is considered 'highly vulnerable' in accordance with TAN15 Section 5, Figure 2.

2 SITE LEVELS

- 2.1 LiDAR data has been obtained for the area and indicates that the site is relatively flat at a level of 131m AOD. This has formed the basis of the level datum for this assessment.

Figure 2.1 – LiDAR Data of Site Area



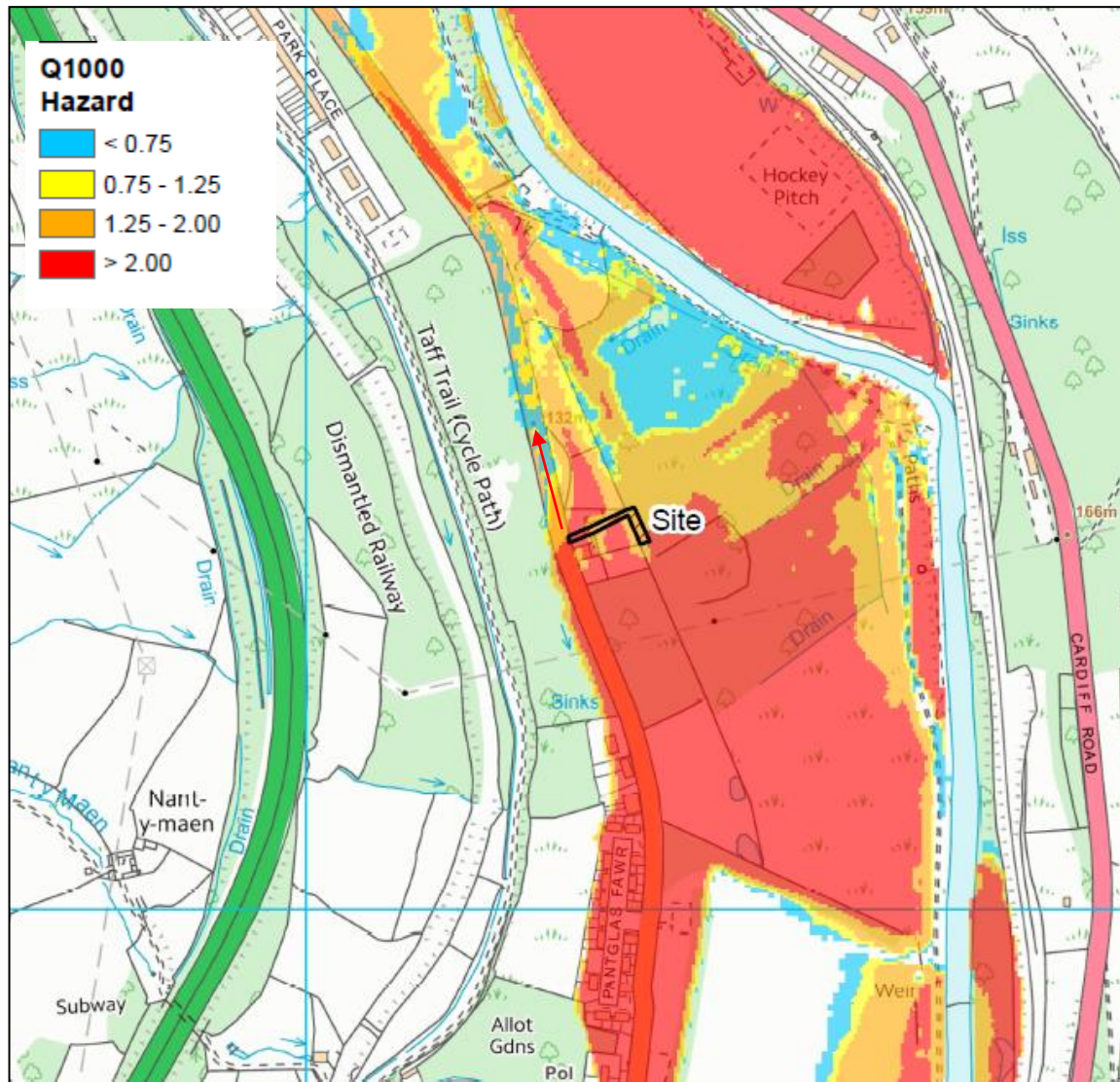
3 FLOOD ALLEVIATION MEASURES

- 3.1 There are extensive existing flood defences on the banks of the River Taff in this area.
- 3.2 The flood data provided by NRW (available for reference in Appendix B) indicates that the defences currently provide protection for a flood event of 1 in 50 year annual probability before they are exceeded / overtopped.
- 3.3 There are no proposals to introduce any further flood alleviation measures as part of this scheme. There are no proposals to introduce wider flood defences or other forms of protection as part of this scheme.

4 ACCESS & EVACUATION ROUTES

- 4.1 There site is accessed via Bronheulog Terrace (B4285) which runs north – south.
- 4.2 Hazard mapping indicates that routes both north and south could become compromised during an extreme flood event. However, the route north is shown to be affected to a lesser extent and should remain passable by emergency vehicles and permit access to the wider highway network including the A470.

Figure 4.1 – 1 in 1000 year (0.1% AEP) Hazard Map & Evacuation Route



5 POTENTIAL FLOODING SOURCES

5.1 Tidal

- 5.1.1 Tidal flooding occurs when a high astronomical tide and storm (tidal surge) exceeds the level of coastal land or coastal flood defences. Tidal flooding can also be caused by 'tide locking' of rivers or estuaries. Tide locking prevents a river from discharging into the sea, causing 'backing up' / surcharge and resulting in tidal / fluvial flooding.
- 5.1.2 This area is outside of tidal influence and has not been considered further.

5.2 Fluvial

- 5.2.1 High flows within the River Taff present a flood risk to the development site. This fluvial source is considered the dominant source of flood risk at this location.

5.3 Pluvial

- 5.3.1 Pluvial sources of flood risk are considered to originate from public sewerage networks, highways drainage and local private infrastructure in the immediate vicinity of or within the proposed development.
- 5.3.2 There are extensive drainage ditches / watercourses indicated within the floodplain land to the east of the development site.
- 5.3.3 There is evidence of traditional kerb and gully highway drainage serving the carriageway of Bronheulog Terrace.
- 5.3.4 Public sewer records indicate no existing infrastructure in the immediate vicinity of the development site.

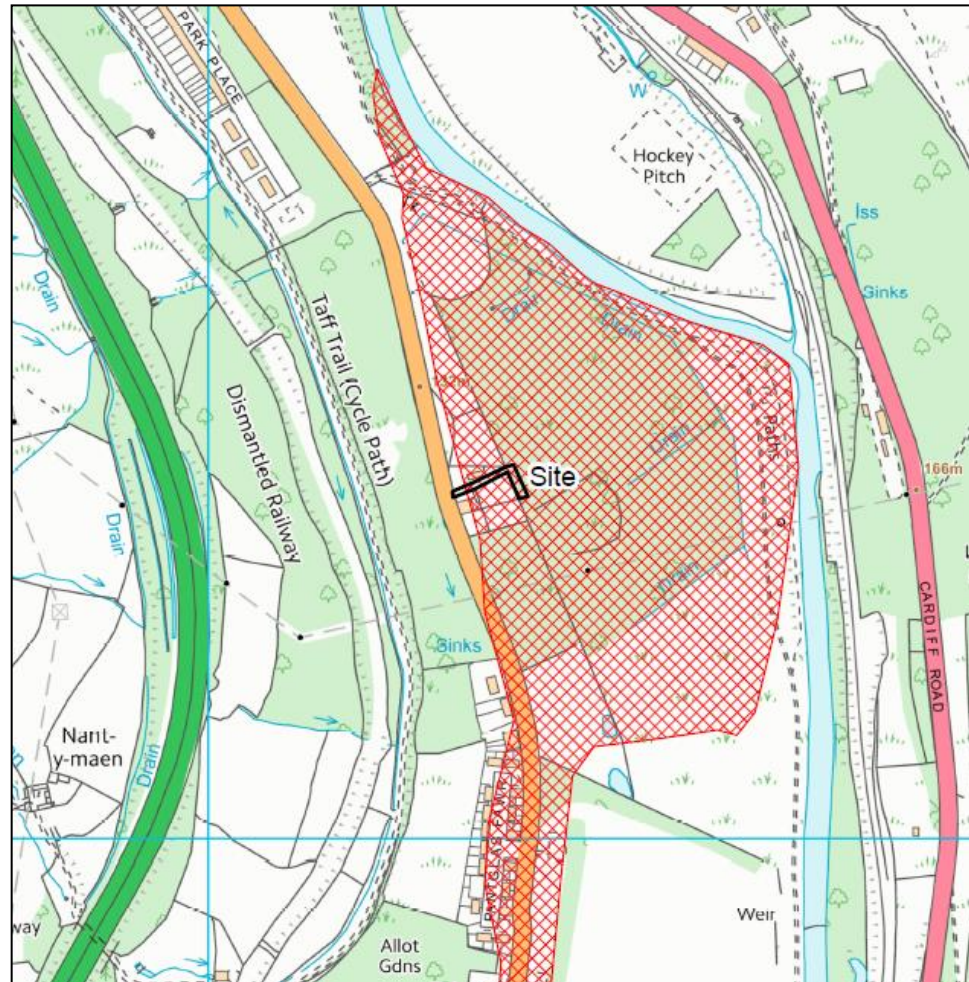
5.4 Groundwater

- 5.4.1 Groundwater flooding occurs when water levels within the ground rise above surface elevations.
- 5.4.2 Archive broad scale mapping suggests that groundwater tables may be shallow in this area. No further site specific ground investigation has been undertaken or made available for further consideration.

6 FLOOD HISTORY

- 6.1 The historic flood outline indicates that the site has been previously impacted by flooding which occurred in December 1979 originating from the River Taff.

Figure 6.1 – NRW Historic Flood Map



7 STRUCTURES INFLUENCING FLOW

- 7.1 The hydraulic model used to inform the flood risk posed to this development includes many structures (culverts, bridges etc) which will have influence over flow and flood risk. However, the most significant influence which will have considerable benefit to this area is the existing flood defences along the bank of the River Taff.

8 PROBABILITY OF FLOODING

8.1 Tidal

8.1.1 Not considered further.

8.2 Fluvial

8.2.1 NRW have provided hydraulic modelling outputs taken from the Merthyr Tydfil to Merthyr Vale Velocity Depth Mapping Study undertaken by Mott MacDonald in September 2010. This model comprises the River Taff from Merthyr Tydfil to Merthyr Vale, using a 1D/2D linked ISIS-TUFLOW hydraulic model utilising a LiDAR DTM base and ReFEH methodology.

8.2.2 This data has informed the flood risk associated with the River Taff which is considered the dominant source of flood risk.

8.2.3 The outputs indicate that the existing flood defences protect the site from flooding events up to a 1 in 50 year annual probability of occurrence. Flood levels may reach 131.21m AOD in a 1 in 100 year event with allowance for climate change over the lifetime of the development which represents a depth of approximately 210mm externally on the development site. This increased to a maximum of 131.69m AOD (690mm) in the most extreme 1 in 1000 year event.

8.3 Pluvial

8.3.1 NRW flood mapping indicates that the site may be vulnerable to surface water flooding which would appear to be attributed to the site's location on the flow path to the River Taff and as a steep sided catchment would respond rapidly to a storm event.

Figure 8.2 – NRW Flood Risk from Surface Water & Small Watercourses



8.4 Groundwater

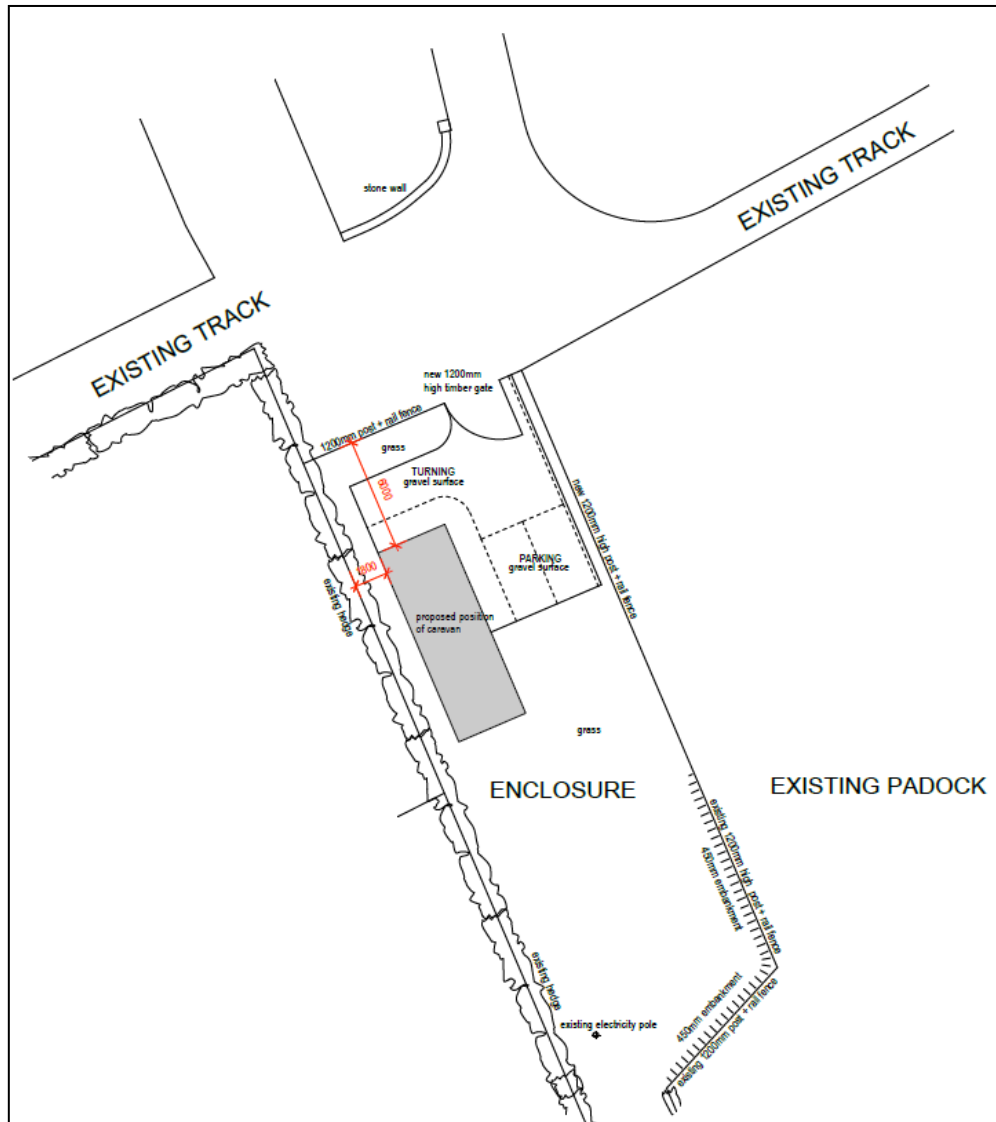
8.4.1 Whilst it is acknowledged that groundwater levels can vary seasonally and there are

indications that groundwater could be at shallow level at this location, the proposed caravan will be elevated in its surroundings and there are no proposed basement levels which may be vulnerable to groundwater ingress.

9 PROPOSED DEVELOPMENT

- 9.1 It is proposed to site a static caravan on land to the rear of Ynysygored Cottages which will be occupied with residential end use.

Figure 9.1 – Proposed Site Plan



- 9.2 The existing ground level is approximately 131m AOD. The caravan will be elevated approximately 1.1m above existing ground level giving a finished floor level (FFL) of 132.1m AOD with a 500mm clear void to the hardstanding beneath.
- 9.3 A full set of current development drawings are available for reference within Appendix A.

10 IMPACT OF FLOODING

- 10.1 Fluvial flood events, should they occur, would have the most significant impact to the occupants of the proposed development.
- 10.2 In the event of flooding from this source, overland flows would originate from the corridor of the River Taff and spread westward across the floodplain.
- 10.3 The site is located on the outer extent of the flood zone and approximately 250m from the watercourse corridor and there would therefore ordinarily be warning of flooding which could impact the application site and its residents.
- 10.4 Recognising the benefit of the existing flood defences, the maximum predicted flood depths relative to key areas are summarised below.

Table 10.1: Defended Scenario - Maximum Flood Levels by Return Period

	Return Period		
	1 in 100	1 in 100 +cc (+20%)	1 in 1000
Max Flood Elevation (m AOD)	131.19	131.21	131.69

Table 10.2: Defended Scenario - Maximum Flood Depths by Return Period

		Flood Depth (m) by Return Period		
Location	FFL / EGL (m AOD)	1 in 100	1 in 100 +cc (+20%)	1 in 1000
External / Garden	131.0	0.19	0.21	0.69
Caravan	132.10	Nil	Nil	Nil

x.xx – indicates flood free – predicted depths are less than FFLs

x.xx – indicates some flooding but within TAN15 acceptable limits

x.xx – indicates flooding in excess of TAN15 acceptable limits

- 10.5 With the current defences in place the caravan itself is predicted to be flood free and provide safe refuge throughout the most extreme of scenarios. The external / garden areas may however experience flooding with depths of up to 690mm in the most extreme 1 in 1000 year (0.1% AEP) event.
- 10.6 As a worst case, a flood consequence assessment must also consider the scenario where existing flood defences may not be maintained or could be the subject of breach or failure over the lifetime of the development. The maximum predicated flood depths in an undefended scenario are summarised below.

Table 10.3: undefended Scenario - Maximum Flood Levels by Return Period

	Return Period	
	1 in 100	1 in 1000
Max Flood Elevation (m AOD)	130.76	132.00

Table 10.4: undefended Scenario - Maximum Flood Depths by Return Period

		Flood Depth (m) by Return Period	
Location	FFL / EGL (m AOD)	1 in 100	1 in 1000
External / Garden	131.0	Nil	1.0
Caravan	132.10	Nil	0.1

x.xx – indicates flood free – predicted depths are less than FFLs

x.xx – indicates some flooding but within TAN15 acceptable limits

x.xx – indicates flooding in excess of TAN15 acceptable limits

- 10.7 The flood data suggests that whilst the external flood levels may be outside of the acceptable limits of TAN15, the caravan itself in its elevated position operates within the recommended tolerated flood depths being flood free in the 1 in 100 year event and experiencing up to 100mm in the 1 in 1000 year event (maximum 600mm acceptable).
- 10.8 It should however be noted that more substantial flooding could be experienced to the surrounding external / garden levels where flood depths could reach a maximum of 1.0m. Residents should therefore be notified of this risk and there should be no attempt made to exit the property upon the onset of flooding.

11 DRAINAGE IMPLICATIONS

- 11.1 With reference to the extract of the DCWW public sewer records below, there is no existing drainage infrastructure indicated in the immediate surroundings.

Figure 11.1 – DCWW Public Sewer Records



- 11.2 Disposal of surface water run-off generated by the proposed development will need to be considered in the hierarchical order dictated by SUDs legislation / current industry best practice and will remain subject to statutory approvals to ensure there is no increased flood risk as a result of the increase in hardstanding areas.

12 WATER DISPLACED BY DEVELOPMENT

- 12.1 As this area of the River Taff is defended the surrounding area is not considered a functional floodplain.
- 12.2 There is to be no change in existing ground levels within the flood zone area and therefore no displacement of floodwater.
- 12.3 The proposed caravan level will be elevated 1.1m above existing ground levels to mitigate for flood risk. Beyond this, flooding will be accepted and permitted internally, there will be no loss of available storage.

13 IMPACT OF DISPLACED WATER

13.1 Not applicable.

14 LONG TERM IMPACT OF DEVELOPMENT

14.1 There are no long term, adverse impacts associated with the proposed development.

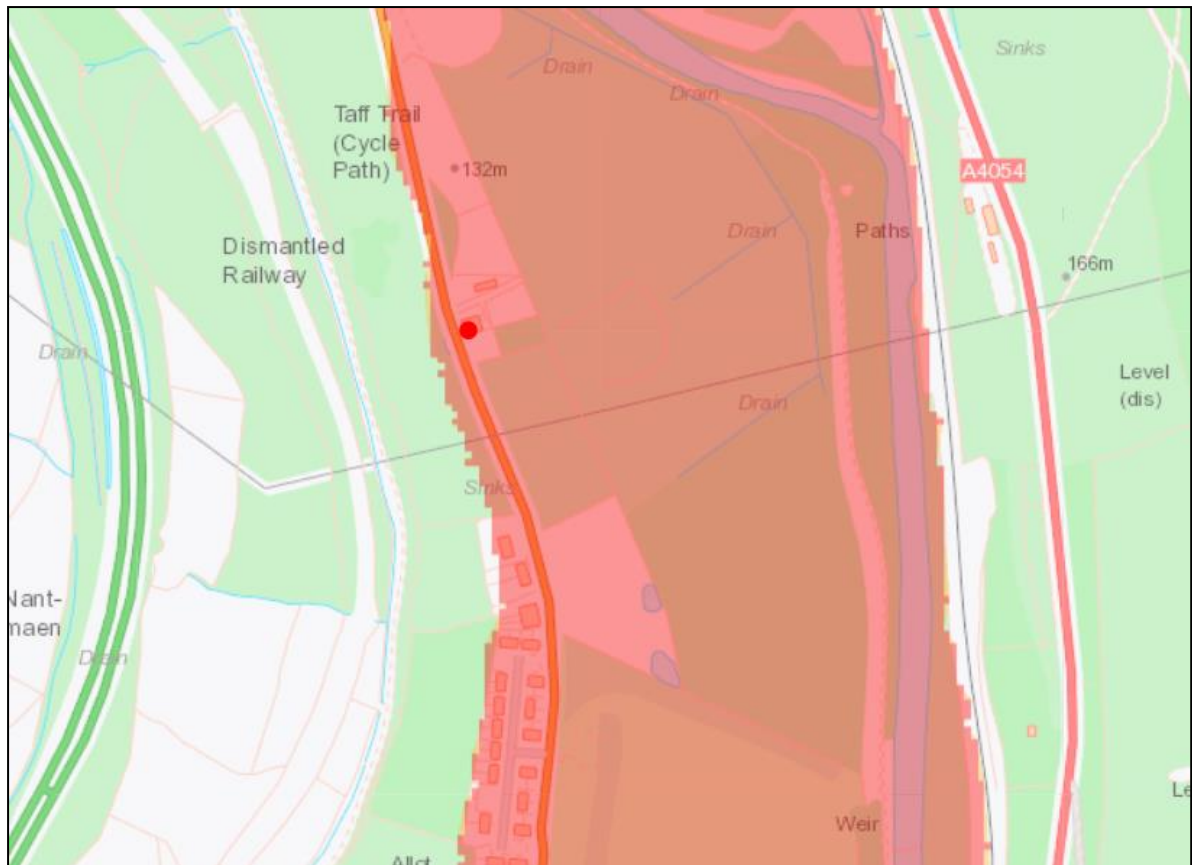
15 ALLOWANCES FOR FUTURE

- 15.1 TAN15 requires the possible impact of climate change to be taken into account in the assessment of flooding for a 100 year lifetime for highly vulnerable development.
- 15.2 The data set provided by NRW only included +20% allowances for climate change and required updates to be made to the hydraulic model to represent the current guidance for +25% allowances. However, given the application is for a static caravan, the 100 year design life is not considered applicable and plus 20% allowances for climate change is a reasonable allowance for the affects of climate change over the anticipated lifetime of this development.

16 RESIDUAL RISKS

- 16.1 The caravan is proposed to be elevated 1.1m above existing ground levels to mitigate for the fluvial flood risk posed by the River Taff.
- 16.2 NRW operate a flood alert and warning system in the area shaded and should be subscribed to by the residents for advanced notice of extreme events.

Figure 16.1 – NRW Flood Warning / Alert Areas



- 16.3 The occupants of the property should be informed of the flood risk thereby managing the consequences of flooding.

17 SUMMARY / CONCLUSIONS

- 17.1 It is proposed to site a static caravan on land to the rear of Ynysygored Cottages, Bronheulog Terrace, Aberfan which would be occupied for residential use.
- 17.2 The site is located within Flood Zone C1 and therefore recognised as an area which, whilst located within the flood zone and under the influence of the River Taff, benefits from significant existing infrastructure including flood defences. As a residential property, the end use is considered 'highly vulnerable'.
- 17.3 NRW hold a detailed hydraulic model in this area and the outputs have been used to inform the flood risk posed to the development. It is proposed to elevate the caravan 1.1m above existing ground levels to a FFL of approximately 132.1m AOD to mitigate for flood risk.
- 17.4 With the current flood defences in place the caravan itself is predicted to be flood free and provide safe refuge throughout the most extreme of scenarios. The external / garden areas may however experience flooding with depths of up to 690mm in the most extreme 1 in 1000 year (0.1% AEP) event.
- 17.5 As a worst case, a flood consequence assessment must also consider the scenario where existing flood defences may not be maintained or could be the subject of breach or failure over the lifetime of the development. The flood data suggests that whilst the external flood levels may be outside of the acceptable limits of TAN15, the caravan itself lies within the recommended tolerated flood depths being flood free in the 1 in 100 year event and experiencing up to 100mm in the 1 in 1000 year event (maximum 600mm acceptable). It should however be noted that more substantial flooding could be experienced to the surrounding external / garden levels where flood depths could reach a maximum of 1.0m. Residents should therefore be notified of this risk and there should be no attempt made to exit the property upon the onset of flooding.
- 17.6 The site is located on the outer extent of the flood zone, some 250m west of the River Taff. As floodwaters would spread from the river corridor there would ordinarily be a good degree of warning of a potentially dangerous flood event that could impact upon the site. NRW operate a flood alert and warning system in this area and residents should be informed of the flood risk and emergency procedures outlined within this report.
- 17.7 Means of access / egress should be sought from / to the north and routes to the south should be avoided upon the onset of flooding.
- 17.8 This FCA demonstrates that the impact / consequence of flooding can be managed over the lifetime of the development as prescribed under TAN15.

APPENDIX A – DRAWINGS

APPENDIX B – NRW DATA