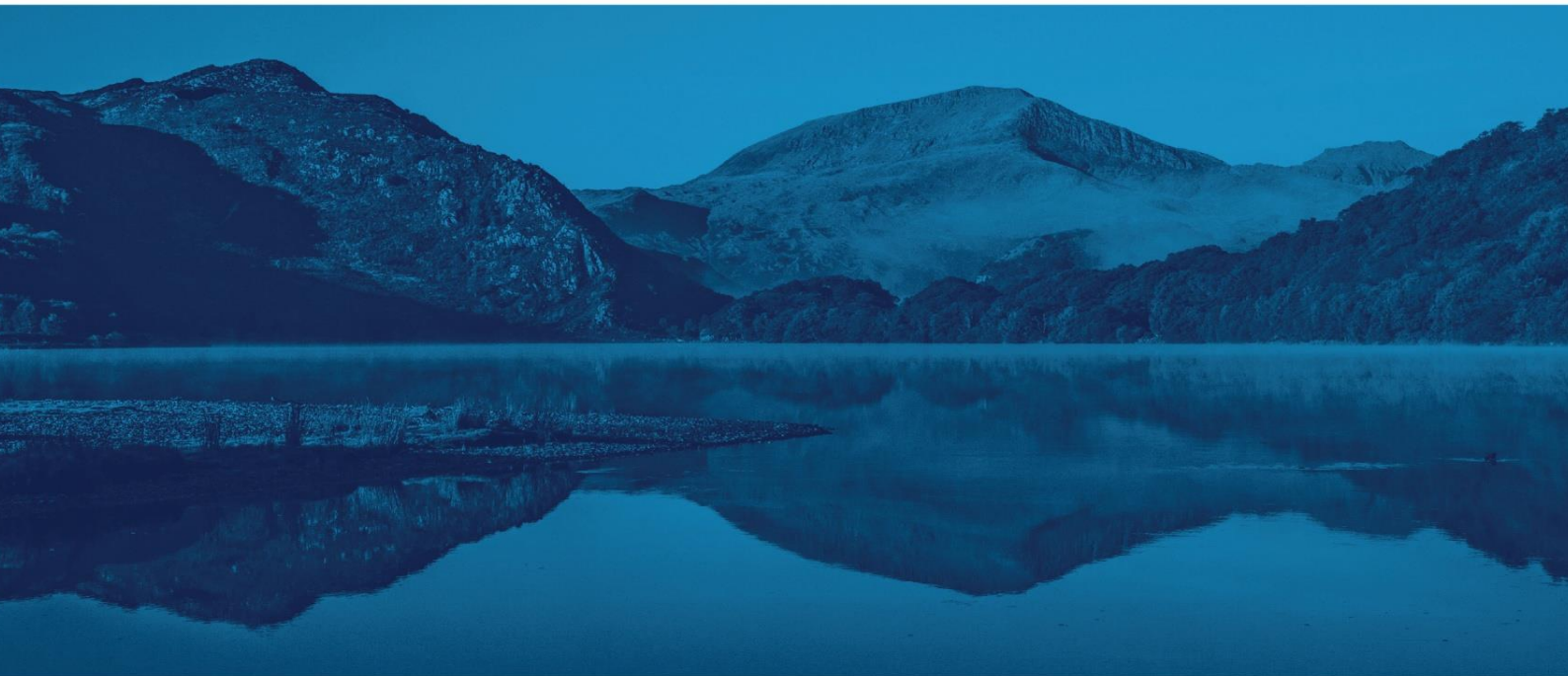




Tuhwnt I'r Afon, Llanarmon Dyffryn Ceiriog

Flood Consequences Assessment

April 2017



Assessment / Modelling / Design

waterco.co.uk

DOCUMENT VERIFICATION RECORD

CLIENT:	Berwyn Barns
SCHEME:	Proposed holiday cottage at Tuhwnt i'r Afon, Llanarmon Dyffryn Ceiriog – Flood Consequences Assessment
INSTRUCTION:	The instruction to carry out this Flood Consequences Assessment was received from Carys Studley of Rostons Limited, acting on behalf of the client

DOCUMENT REVIEW & APPROVAL

AUTHOR:	Aled Williams BSc (Hons) MCIWEM
CHECKER:	Jordan Jones BSc (Hons) MCWIEM
APPROVER:	Josh Rigby BSc (Hons)

ISSUE HISTORY

ISSUE DATE	COMMENTS
21/04/2017	First issue

Registered office: Waterco Ltd, Eden Court, Lon Parcwr Business Park, Ruthin, Denbighshire LL15 1NJ

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Introduction

Waterco Consultants have been instructed to prepare a limited Flood Consequences Assessment (FCA) in respect of a proposed holiday cottage at Tuhwnt i'r Afon, Llanarmon Dyffryn Ceiriog, Llangollen, LL20 7LH.

The purpose of this report is to outline the potential flood risk to the site and the proposed measures which could be incorporated to mitigate the identified flood risk. This report has been prepared in accordance with the guidance contained in Planning Policy Wales (PPW) and Technical Advice Note 15 (TAN15): Development and Flood Risk.

This report has been prepared in consultation with Natural Resources Wales (NRW). NRW correspondence (Appendix A) states that:

'Initially, a topographic survey, to determine whether or not ground levels at the development location are similar to those at the other farm buildings which sit well outside the flood zone, may be sufficient. We note that the intention is to demolish the existing shed and rebuild on the site. If this survey finds that ground levels are not significantly raised above the broad-scale modelled flood outline, there may be scope to raise finished floor levels significantly to reduce the risk of flooding in the event of blockage at the bridge. In either of the above cases, we may be able to accept a qualitative, limited FCA.'

'If the survey finds that the development site is not significantly raised above the flood zone, and the developer does not propose to raise finished floor levels significantly, then the FCA should consider the flood risks in more detail, particularly under blockage conditions, and also identify any appropriate mitigation measures that would be required to manage any identified risks.'

This limited FCA focuses on a qualitative assessment of flood risk through review of topographical data.

Site Description

The site is located approximately 2.7km north-west of Llanarmon Dyffryn Ceiriog at National Grid reference: 313699E 334753N. The site forms part of an upland farm which also includes a self-catering holiday enterprise comprising two units accommodating 6 and 7 persons. A location plan and an aerial image are included in Appendix B.

The site currently comprises a single storey prefabricated hut which is in a poor state of repair and no longer required by the farm business. The site is bordered by holiday cottages to the north, farm buildings to the east, agricultural land to the south and an agricultural building with the River Ceiriog beyond to the west.

Access to the site is provided from a private access road immediately north of the site. The access road crosses over the River Ceiriog to the west of the site.

Local Topography

A Topographical Survey has been undertaken by M B Surveying Ltd in April 2017 and is included in Appendix C. The Topographical Survey shows that levels in the location of the proposed holiday cottage vary from 299.26 metres Above Ordnance Datum (m AOD) in the west to 300.22m AOD in the north-east. The existing finished floor level is 300.04m AOD. The agricultural building west of the site has a finished floor level of 299.16m AOD and the existing holiday cottages north of the site have a finished floor level of 303.53m AOD.

The Topographical Survey identifies that the River Ceiriog, west of the site, has a top bank level of approximately 298.66m AOD and a river bank level of 296.76m AOD. The level of the bridge deck over the River Ceiriog is approximately 299m AOD.

Topographic levels to metres Above Ordnance Datum (m AOD) have also been derived from a 1m resolution NRW composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). A review of LiDAR data shows that the catchment is relatively steeply sloping. A LiDAR extract is included in Appendix C.

Development Proposals

The proposed development is for a two bed single storey holiday cottage. The proposed finished floor level is 300.4m AOD. A proposed development plan is included in Appendix C.

Flood Zone Category and Policy Context

Flood Zone Category

The Welsh Government Development Advice Map included in Appendix D shows that the location of the proposed holiday cottage is within Flood Zone B – an area known to have been flooded in the past. The proposed holiday cottage is shown outside of the Flood Zone C2 extent – an area considered to have a less than 0.1% annual probability of flooding.

The Natural Resources Wales (NRW) 'Flood Risk – Rivers and Sea' map included in Appendix C shows that the location of the proposed holiday cottage is within an area outside of the extreme flood extent (Flood Zone 1), meaning it has a less than 0.1% annual probability of flooding. Land immediately west of the holiday cottage is classified as Flood Zone 2 – an area with between a 1% and 0.1% annual probability of fluvial flooding.

NRW state in their correspondence (included in Appendix A) that the NRW flood map information in this location is based on coarse broad-scale modelling which is not designed to be accurate at an individual property level. NRW further state that under flooding conditions, or if a blockage of the nearby bridge structure were to occur, the existing building and proposed holiday cottage could experience some degree of flood risk.

Development Vulnerability Classification

The proposed residential development is considered to be 'highly vulnerable' development in accordance with Figure 2 of the Welsh Government's Technical Advice Note 15 – Development and Flood Risk (TAN15).

TAN15 states that highly vulnerable development can be considered within Flood Zone B. Using a qualitative approach, this report will establish whether the flood risk associated with the adjacent flood zone classification can be safely managed. A qualitative assessment will also be made to assess flood risk from structure blockage.

Sources of Flooding and Probability

Fluvial

The nearest watercourse is the River Ceiriog which is located approximately 20m west of the site. The River Ceiriog flows south in this location. Other watercourses in the area include an unnamed tributary of the River Ceiriog located approximately 65m north of the site.

Fluvial flooding could occur if the River Ceiriog overtopped its banks during or following an extreme rainfall event. Flooding could also occur from a blockage at the inlet of the access road bridge located approximately 20m west of the site.

Although the site is designated as Flood Zone B (an area known to have flooded in the past) on the Welsh Government Development Advice Map, there are no records or anecdotal evidence available to suggest that the site has flooded in the past.

As requested by NRW, a qualitative assessment of flood risk informed by a topographical survey should firstly be undertaken. The Topographical Survey (Appendix C) identifies the existing finished floor level of the outbuilding as 300.04m AOD. The proposed finished floor level is 300.4m AOD. The proposed finished floor level is approximately 3.64m above the bank level of the River Ceiriog.

Given the significant height above the river bank, it is considered unlikely that the proposed holiday cottage would be susceptible to flooding during extreme flood events. Water levels greater than 3.64m would be required for flooding to occur at the proposed building. As shown by LiDAR data (Appendix C) and as represented by the NRW 'Flood Map for Planning' (Appendix D), flooding to the site and wider farmyard (Tuhwnt i'r Afon) is limited due to the steep rise in topography from the river. Flood water is generally contained within lower lying land south of the site.

A residual risk arises from a blockage of the access road bridge located approximately 20m west of the site. As shown on the Topographical Survey, the level of the bridge deck is 299m AOD and 1.4m below the proposed finished floor level of the holiday cottage. Should a blockage of the bridge occur, flows would be directed over the bridge and downstream. A wooden post and rail fence acts as a barrier on the sides of the bridge. The fence would not obstruct flows being directed over the bridge structure and downstream. There are no distinct flow routes present which would direct any potential flood water towards the site.

Given the rise in topography from the River Ceiriog to the proposed holiday cottage, and that the proposed holiday cottage will be located outside of the extreme 0.1% annual probability flood extent, it can be concluded that the flood risk to the site is low.

Tidal

The site is situated above 299m AOD and is significantly above sea level. The site is therefore not at risk of tidal flooding.

Surface Water

Surface water flooding occurs when rainwater does not drain away through the normal drainage system or soak into the ground. It is usually associated with high intensity rainfall events, but can also occur with lower intensity rainfall or melting snow where the ground is saturated, frozen or developed, resulting in overland flow and ponding in depressions in topography. Surface water flooding can occur anywhere without warning. However flow paths can be determined by consideration of contours and relative levels.

The NRW 'Flood Map for Surface Water' (Appendix D) shows that the location of the proposed holiday cottage is at very low risk of surface water flooding, meaning it has a less than 0.1% annual probability of flooding.

Any potential surface water flooding arising at or near to the site would be directed south-west, away from the site, following the local topography.

It can be concluded that the risk of surface water flooding is low.

Sewer Flooding

Flooding from sewers can occur when a sewer is overwhelmed by heavy rainfall, becomes blocked, is damaged, or is of inadequate capacity. Flooding is mostly applicable to combined and surface water sewers.

The site is located in a rural area and there are no public sewers in the immediate vicinity of the site. There is therefore no risk of flooding from public sewers.

Groundwater Flooding

Groundwater flooding occurs when water levels beneath the ground rise above normal levels. Prolonged heavy rainfall soaks into the ground and can cause the ground to become saturated. This results in rising groundwater levels which leads to flooding above ground.

There are no records of groundwater flooding at or near to the site. Any potential groundwater flooding arising at or near to the site would be directed west, away from the site, following the local topography.

It can therefore be concluded that the risk of groundwater flooding is low.

Artificial Sources of Flooding

There are no canals in the vicinity of the site. The online NRW Reservoir Flood Risk map shows that the site is not at risk of flooding from reservoirs. It can therefore be concluded that there is no risk of flooding from artificial sources.

Summary of Potential Flooding

It can be concluded that the site is at low risk of flooding from all sources. However, there is potential for fluvial flooding to occur near to the site. The associated risk has been used to inform mitigation design as discussed in the following section.

Mitigation

It is proposed to set finished floor levels at a minimum of 300.4m AOD (up to 1.14m above surrounding ground heights and approximately 1.2m above the approximate level of the 0.1% annual probability flood extent).

The area is covered by the NRW Flood Alert service. Site owners should register to receive flood alerts. Occupiers should be made aware of the potential flood risk to the existing access road during extreme flood events. The existing access road bridge to the west of the site should not be used in times of flood.

Impact on Flood Risk Elsewhere

The proposed development is for the replacement of a disused agricultural building with a holiday cottage. The proposed building will be located outside of the extreme flood extent (0.1% annual probability flood extent) and will therefore not remove flood storage space from the floodplain.

Conclusions

The proposed development is for the replacement of a disused agricultural building with a holiday cottage.

The proposed holiday cottage is shown to be located within Flood Zone Flood Zone B – an area known to have been flooded in the past, and outside of the Flood Zone C2 extent – an area considered to have a less than 0.1% annual probability of flooding.

The principal source of flooding at this site is fluvial flooding from the River Ceiriog. A qualitative assessment of flood risk based on a review of the local topography has been requested by Natural Resources Wales. The proposed finished floor level (300.4m AOD) will be situated 3.64m above the bank level of the River Ceiriog. Given the significant elevation above the river bank, and that the site is located outside of the extreme 0.1% annual probability flood extent, it is considered that the risk of fluvial flooding is low. The proposed floor level is approximately 1.2m above the level of the 0.1% annual probability flood extent as defined by extant NRW flood mapping.

A residual risk arises from a blockage of the access road bridge located approximately 20m west of the site. In the event of blockage, flood water would back up behind the bridge structure before overtopping the bridge deck (situated at 199m AOD and 1.4m below the proposed floor level). The flood risk to the development associated with a blockage of the bridge structure is considered to be low.

The proposed development will not increase flood risk elsewhere.

Recommendations

1. Submit this Flood Consequences Assessment and Drainage Strategy to the Planning Authority and NRW to establish whether a qualitative assessment will suffice to assess the potential flood risk to the site.

Appendix A – NRW Correspondence



**Cyfoeth
Naturiol
Cymru
Natural
Resources
Wales**

Ein cyf/Our ref: CAS-28060-L1X9

Eich cyf/Your ref: P/2017/0002

Ebost/Email: northplanning@cyfoethnaturiolcymru.gov.uk

Ffôn/Phone: 03000 65 3785

Head of Environment and Planning
Wrexham County Borough Council
16 Lord Street
WREXHAM
LL11 1LG

7 February 2017

Er sylw / For the attention of: Matthew Phillips

Annwyl / Dear Mr Phillips

TOWN AND COUNTRY PLANNING ACT 1990
DEDDF CYNLLUNIO GWLAD A THREF 1990

BWRIAD / PROPOSAL: Removal of disused timber shed/hut and erection of new single-storey 2 no. bedroom holiday let accommodation

LLEOLIAD / LOCATION: Tuhwntir Afon, Swch Road, Llanarmon

Thank you for consulting Natural Resources Wales (NRW) about the above, which was received on 11 January 2017

We have significant concerns with the proposed development as submitted. We recommend that you should only grant planning permission if the scheme can meet the following requirement. We would object if the scheme does not meet this requirement.

Requirement: The applicant should submit a Flood Consequence Assessment in order to identify any appropriate mitigation measures

Flood Risk

The existing agricultural building lies on the edge of Zone C2 as defined in TAN 15 Development & Flood Risk and shown on Welsh Government's Development Advice Map. Natural Resources Wales' Flood Map information confirms that the existing building lies on the limits of the 0.1% AEP (1 in 1000 annual chance) fluvial flood risk outline. In addition, the existing building lies on the edge of the 0.1% AEP (1 in 1000 annual chance) surface water outline, as shown on our Flood Map for Surface Water.

The flood map information in this location is based on coarse broad-scale modelling which is not designed to be accurate at an individual property level. There is a culvert/bridge structure spanning the River Ceiriog in the vicinity of the building. Under flood conditions,

or if a blockage of this structure were to occur, the existing building (and therefore the proposed residential cabin) could experience some degree of flood risk (local topography would dictate that risk).

Requirement: Based on the above, and given the ‘Highly Vulnerable’ nature of the proposed development (as per Figure 2 of TAN 15), we would recommend that a Flood Consequences Assessment (FCA) be produced to support any planning application at this location. The approach is justified under A1.6 of TAN15, and additionally, Section 11.1 of TAN15 indicates that a FCA would be required ‘in all other zones where flooding is identified as a material consideration’.

Initially, a topographic survey, to determine whether or not ground levels at the development location are similar to those at the other farm buildings which sit well outside the flood zone, may be sufficient. We note that the intention is to demolish the existing shed and rebuild on the site. If this survey finds that ground levels are *not* significantly raised above the broad-scale modelled flood outline, there may be scope to raise finished floor levels significantly to reduce the risk of flooding in the event of blockage at the bridge. In either of the above cases, we may be able to accept a *qualitative, limited FCA*.

If the survey finds that the development site is not significantly raised above the flood zone, and the developer does not propose to raise finished floor levels significantly, then the FCA should consider the flood risks in more detail, particularly under blockage conditions, and also identify any appropriate mitigation measures that would be required to manage any identified risks.

Flood Evacuation

Given the nature of the proposed development, and given that the primary access and egress route to, and from, the development crosses the Afon Ceiriog, we would recommend that you consult the local authority’s Emergency Planning Team on the acceptability of the proposals relating to safe evacuation of the site under flood conditions.

Foul Drainage

With respect to the discharge (of effluent) to ground or surface water, the applicant will need to apply for an environmental permit or register an exemption with Natural Resources Wales. The applicant must obtain any necessary permit or exemption prior to commencement of work on site. Septic tanks and small sewage treatment works may be registered as exempt from the requirement to obtain an environmental permit if certain criteria is met. More information, including a step by step guide to registering and the relevant application forms are available on our website: <https://naturalresources.wales/apply-for-a-permit/water-discharges/?lang=en>. Where private sewage treatment/disposal facilities are utilised, they must be installed and maintained in accordance with British Standards 6297 and Approved Document H of the Building Regulations..

Protected Sites

In respect of protected sites, the Afon Dyfrdwy (River Dee) SSSI and River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC, the proposal is immediately adjacent to a tributary of the Afon Ceirig, whose confluence with the Ceiriog is just 40metres downstream. The

local authority, whilst undertaking it's HRA should satisfy themselves that there will no effect upon water quality of the Afon Ceiriog and hence the River Dee SAC features,

Protected Species

The applicant has submitted an ecological report for the purposes of informing the public decision making process. (Reference:

Davies, F. (2016) Site at Tuhwntirafon, Llangollen: Daytime Bat and Bird Survey. Cheshire Ecological Services. Unpublished.

Bats

We note that the bat report submitted in support of the above application (See above for reference) has identified that bats are present at the application site. From the information contained in the bat report, we consider that the proposed development represents a lower risk for bats, as defined in our guidance document '*Natural Resources Wales Approach to Bats and Planning* (2015)'.

Bats and their breeding sites and resting places are protected under the Conservation of Habitats and Species Regulations 2010 (as amended). Any development that would contravene the protection afforded to bats under the Regulations would require a derogation licence from Natural Resources Wales. A licence may only be authorised if:

- i. There is no satisfactory alternative and
- ii. The action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in its natural range. In addition,
- iii. the development works to be authorised must be for the purposes of preserving public health or safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment.

Paragraph 6.3.7 of Technical Advice Note 5: Nature Conservation and Planning (TAN5) states that your Authority should not grant planning permission without having satisfied itself that the proposed development either would not impact adversely on any bats on the site or that, in its opinion, all three conditions for the eventual grant of a licence are likely to be satisfied.

In this case, the bat report concludes that the proposed development is not likely to harm or disturb the bats or their breeding sites and resting places at this site, provided that avoidance measures described in the report are implemented. We concur with this conclusion. Also, because the development represents a lower risk to bats in this case, we do not consider that the development is likely to be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in its natural range.

Therefore, we do not object to the proposal, subject to all avoidance measures described in the bat report being set out in a method statement and secured through the inclusion of suitable planning conditions and/or a Section 106 agreement.

This advice applies to the proposal in its present form. If the plans are changed in ways that may harm or disturb the bats or their breeding sites and resting places at this site, you would need a revised bat report that takes account of such changes. Please consult us again if a revised bat report concluded that this is no longer a lower risk case. Otherwise, our advice for lower risk cases would still apply and we would recommend that you secure the avoidance measures described in the revised bat report. If, in light of modifications, it was no longer possible to avoid harming or disturbing the bats or their breeding sites and resting places at this site, the applicant would also need a licence from Natural Resources Wales and probably additional mitigation measures to reduce adverse effects

Please do not hesitate to contact me if you require clarification on the above.

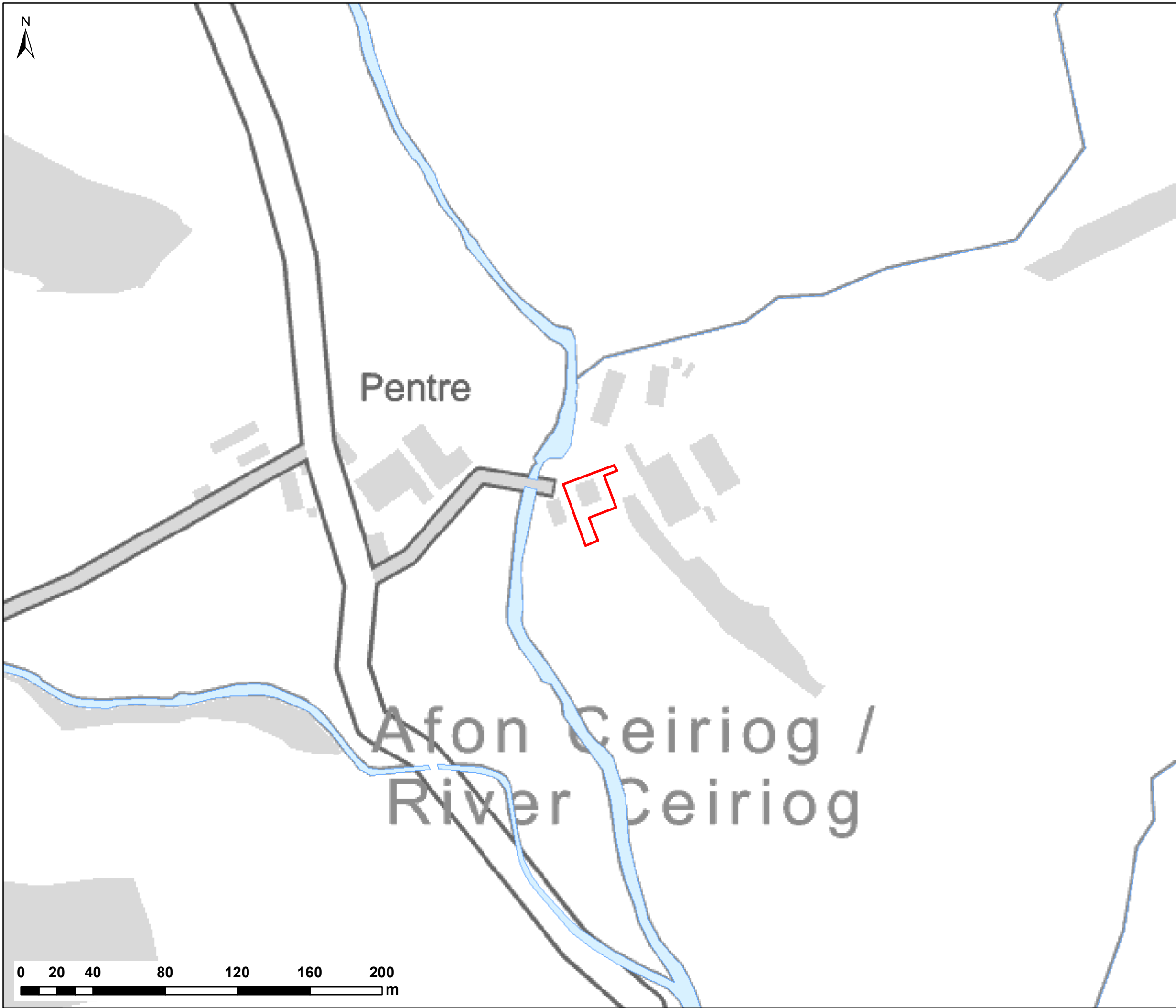
Our comments above only relate specifically to matters that are included on our checklist “Natural Resources Wales and Planning Consultations” (March 2015) which is published on our website: (<https://naturalresources.wales/planning-and-development/planning-and-development/?lang=en>). We have not considered potential effects on other matters and do not rule out the potential for the proposed development to affect other interests, including environmental interests of local importance. The applicant should be advised that, in addition to planning permission, it is their responsibility to ensure that they secure all other permits/consents relevant to their development.

Yn gywir / Yours sincerely

Meryl Read

Meryl Read
Uwch-gynghorydd Cynllunio Datblygu /Senior Development Planning Advisor
Cyfoeth Naturiol Cymru / Natural Resources Wales

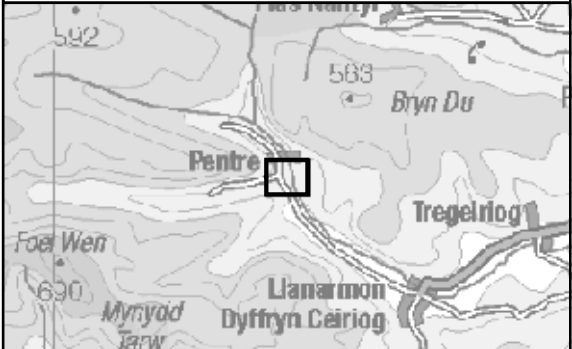
Appendix B – Location Plan & Aerial Image



NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

-  Site Boundary
-  Watercourses / Water Bodies



CLIENT: BERWYN BARNES			
 Waterco Ltd Eden Court, Ruthin, LL15 1NJ 01824 702220 www.waterco.co.uk			
SCHEME: TUHWNT I'R AFON, LLANARMON DYFFFRYN CEIRIOG			
PLOT TITLE: LOCATION PLAN			
PLOT STATUS: FINAL			DATE: 19/04/2017
DRAWN: RCL	CHECKED: AW	APPROVED: JR	PLOT SCALE @ A3: 1:2,000 (UNLESS STATED OTHERWISE)
PLOT NAME: w10332-Location_Plan			REV: -



NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

Site Boundary

CLIENT:

BERWYN BARNs

Waterco Ltd
Eden Court, Ruthin, LL15 1NJ

01824 702220
www.waterco.co.uk

SCHEME:

**TUHWNT I'R AFON,
LLANARMON DYFFFRYN CEIRIOG**

PLOT TITLE:

AERIAL PLAN

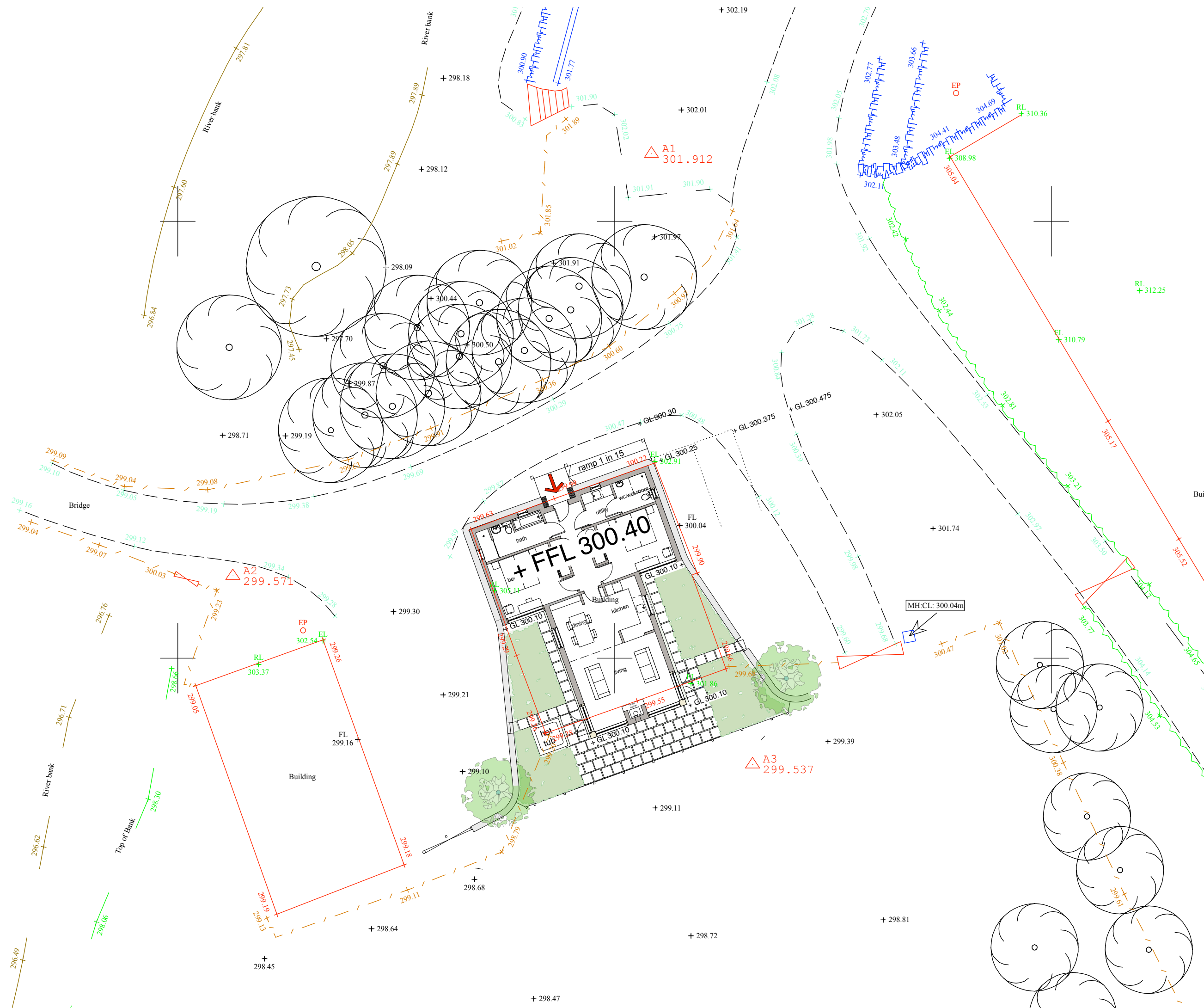
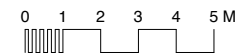
PLOT STATUS:			DATE:
FINAL			19/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	AW	JR	1:2,000
			(UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w10332-Aerial_Plan	-



Appendix C – Development Plan & Topographical Survey



GL = proposed ground level
FFL proposed finished floor level

Proposed Hoiday Cottage
Tu Hwnt i'r Afon.
Llanarmon DC

Proposed Floor Levels
based on survey information

Adrian Jones Associates
April 2017
SK01

334800N

334775N

334750N

334725N

334700N

334800N

334775N

334750N

334725N

334700N



Legend	
AV	Air valve
BH	Borehole
BOL	Bollard
BT	British Telecom cover
CATV	Cable television cover
CL	Cover level
DPC	Damp proof coarsing level
Earth/ER	Earthing rod
ELEC	Electric cover
EP	Electricity pole
Fence VR	Iron railing fence
Fence CB	Closeboard fence
Fence CP&P	Concrete post & panel fence
Fence Pa	Palisade fence
Fence PW	Post and wire fence
Fence PIR	Post and rail fence
Fence P/P	Post and panel fence
FFL	Finished floor level
FIB	Flower bed
FH	Fire Hydrant
GY	Gully
GAS	Gas cover
IC	Inspection chamber
IL	Invert level
INV	Invert level
LP	Lamp post
LT	Light
MH	Manhole
Nymex	Telecommunications cover
OSBM	Ordnance Survey Bench Mark
PTM	Parking ticket machine
RE	Rodding eye
RS	Road sign
R/W	Retaining wall
SBX	Switch box
SP	Sign post
SPS	Safety playing surface
ST	Stop tap
SV	Service valve
TBM	Temporary Bench Mark
TP	Telegraph pole
TRP	Trial pit
TRL	Traffic light
W	Water cover
WL	Water level
WO	Wash out

Building	Building overhead / Foundations / Ruins
---	Road edge / Change of surface / Drain
---\---	Change of slope
---\---	Fence
---	Safety barrier
---	Overhead cable
---	Gate
---	Hedge
---	Limit of foliage/tree canopies
+	Stile
+	Tree
+	Spot level

Co-ordinates and Levels related to Ordnance Survey National Grid and Datum using Leica's GS08+ dual frequency GNSS receiver and Leica Spiderweb RINEX post processing.

Station	Easting	Northing	Level
A1	313702.112	334778.899	301.912
A2	313678.145	334754.707	299.571
A3	313707.893	334743.925	299.557

REV	DESCRIPTION	DWN	CHKD	DATE
-----	-------------	-----	------	------

CLIENT Mr & Mrs Hughes C/o Rostons

PROJECT Tuhwnt

TITLE Topographical Survey

DWN	DATE	CHKD	DATE	APPD	DATE	SCALE
MB	15/04/17					1-200@A1

MB
SURVEYING LTD
Land & Hydrographic Surveyors

Pine Cottage, Kelsall Road,
Ashton Hayes, Cheshire, CH3 8BH
Tel: 01829 759306
www.mbsurveying.co.uk

Drawing Number	MBS756	A1
REV		





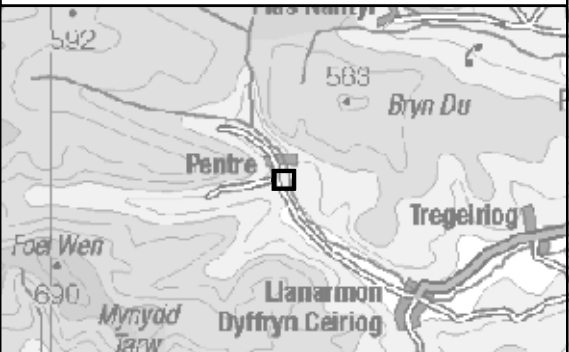
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- + Spot Level

LIDAR Elevations (mAOD)

- < 295
- 295 - 300
- 300 - 305
- 305 - 310
- > 310



CLIENT:

BERWYN BARNES



Waterco Ltd
Eden Court, Ruthin, LL15 1NJ

01824 702220
www.waterco.co.uk

SCHEME:

**TUHWNT I'R AFON,
LLANARMON DYFFRYN CEIRIOG**

PLOT TITLE:

LIDAR ELEVATIONS
1m RESOLUTION

PLOT STATUS:

FINAL

DATE:

19/04/2017

DRAWN:

RCL

CHECKED:

AW

APPROVED:

JR

PLOT SCALE @ A3:

1:1,000

(UNLESS STATED OTHERWISE)

PLOT NAME:

w10332-LIDAR_Elevations

REV:

-

Appendix D – Flood Maps

TAN15 Development Advice Map

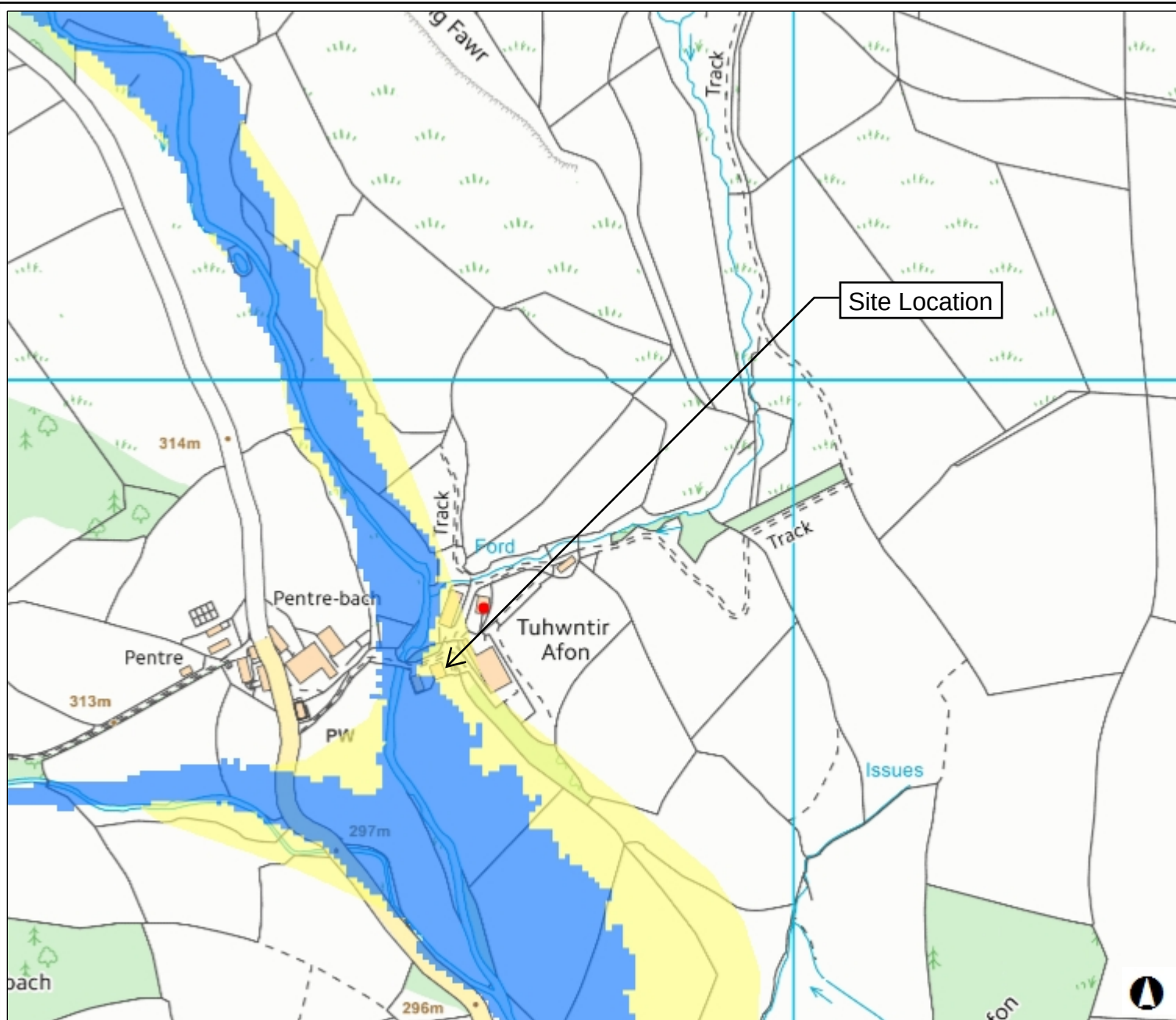
Map Perygl Llifogydd / Flood Risk Map

Allwedd / Map Key

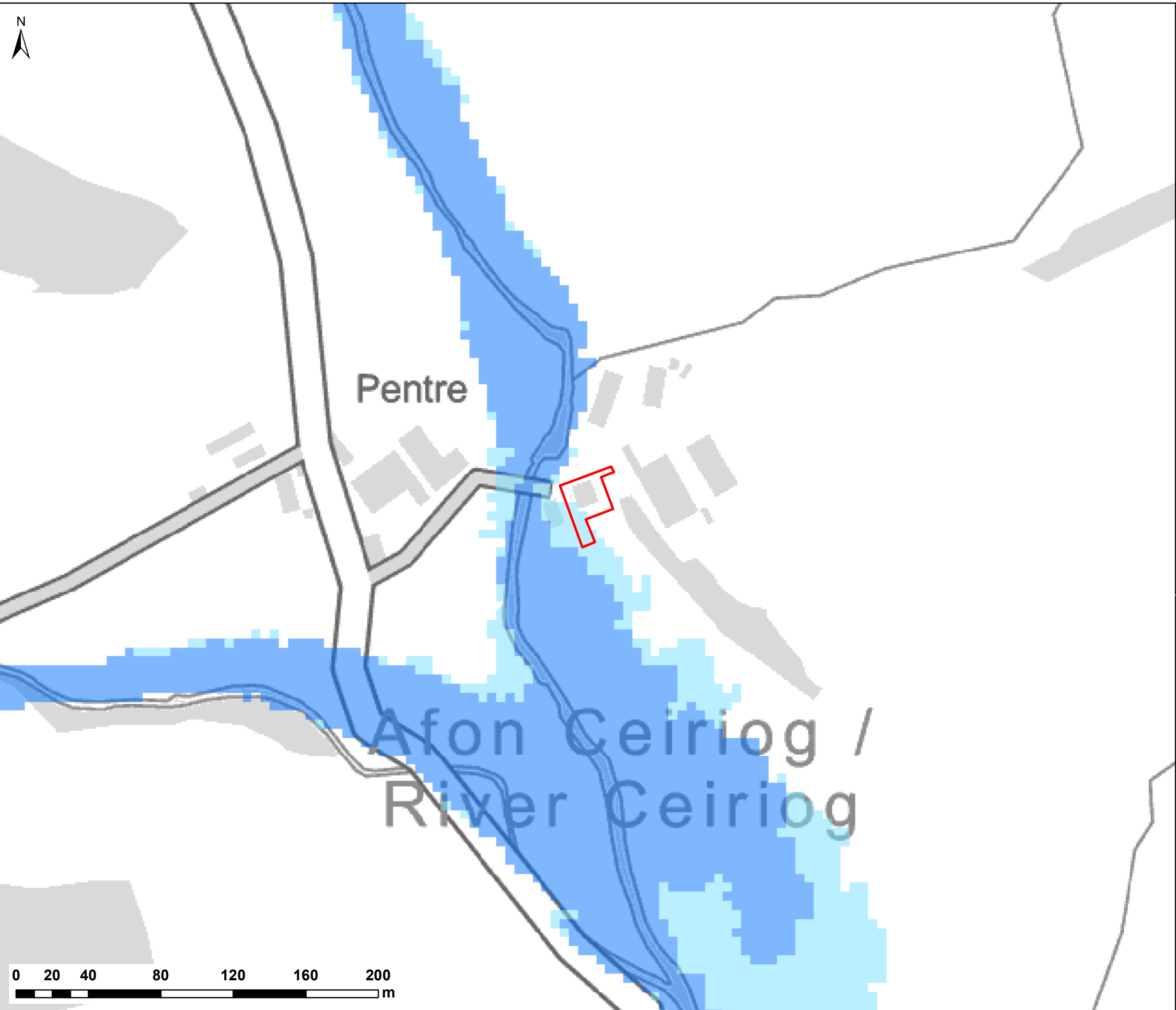
-  Zone C1
-  Zone C2
-  Zone B
-  Zone A

Graddfa / Scale 1: 5,001

Dyddiad / Date
21/04/2017



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NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Flood Zone 2
- Flood Zone 3

CLIENT:

BERWYN BARNES



Waterco Ltd
Eden Court, Ruthin, LL15 1NJ

01824 702220
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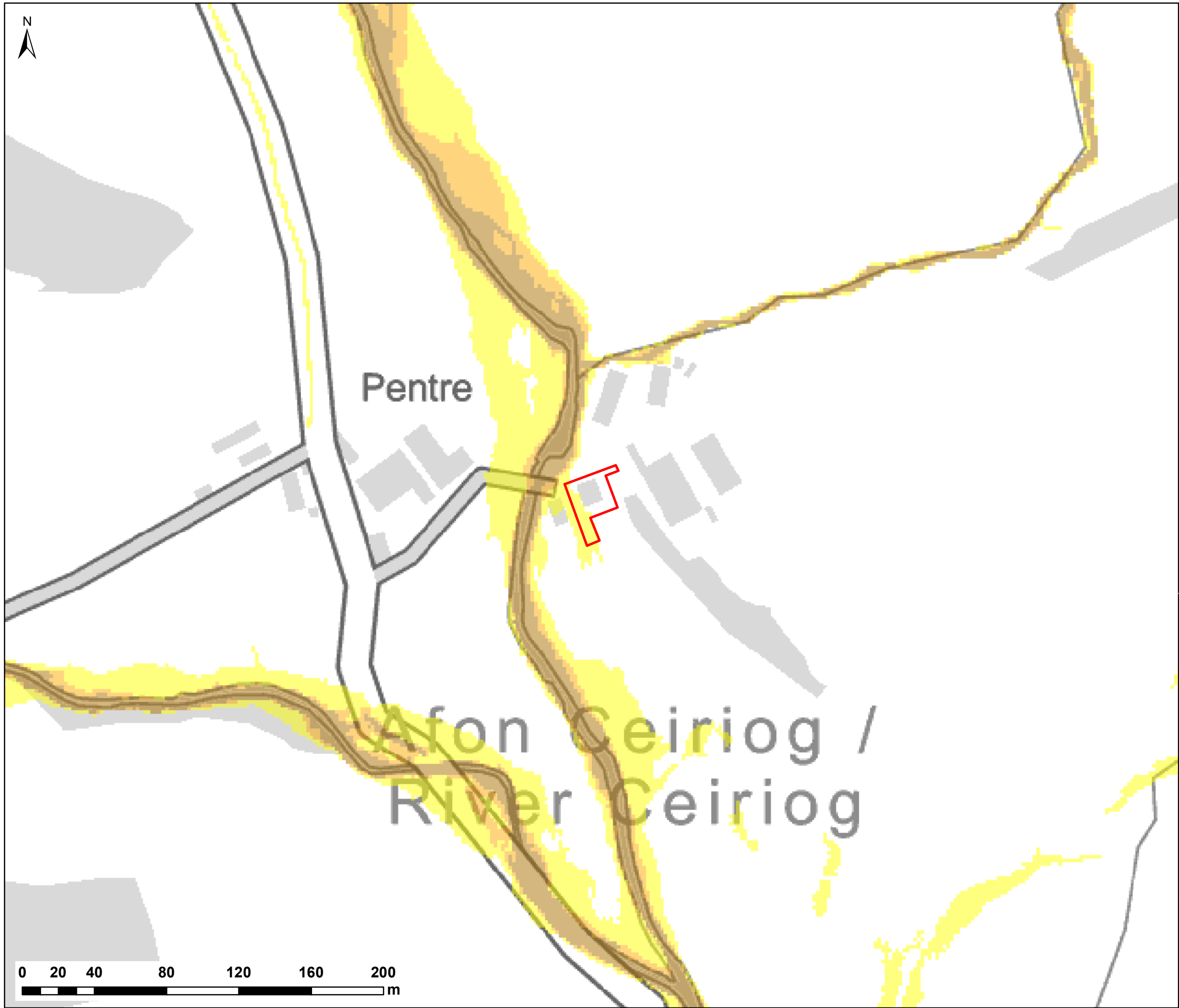
SCHEME:

**TUHWNT I'R AFON,
LLANARMON DYFFRYN CEIRIOG**

PLOT TITLE:

**NRW FLOOD MAP FOR PLANNING
APRIL 2017**

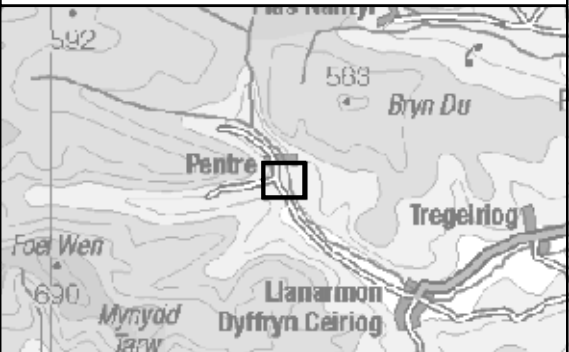
PLOT STATUS:			DATE:
FINAL			19/04/2017
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	AW	JR	1:2,000 (UNLESS STATED OTHERWISE)
PLOT NAME:			REV:
w10332-NRW_FloodMap			-



NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

-  Site Boundary
-  High Risk (3.33% AEP Event)
-  Medium Risk (1.0% AEP Event)
-  Low Risk (0.1% AEP Event)



CLIENT:

BERWYN BARNES



Waterco Ltd
Eden Court, Ruthin, LL15 1NJ

01824 702220
www.waterco.co.uk

SCHEME:

**TUHWNT I'R AFON,
LLANARMON DYFFRYN CEIRIOG**

PLOT TITLE:

**NRW FLOOD MAP FOR
SURFACE WATER
APRIL 2017**

PLOT STATUS:

FINAL

DATE:

19/04/2017

DRAWN:

RCL

CHECKED:

AW

APPROVED:

JR

PLOT SCALE @ A3:

1:2,000

(UNLESS STATED OTHERWISE)

PLOT NAME:

w10332-NRW_SW_FloodMap

REV:

-