Porthygan Farm, Wrexham

Flood Consequences Assessment

March 2025



Waterco

Assessment | Modelling | Design

Project Information	
Project:	Porthygan Farm, Wrexham
Report Title:	Flood Consequences Assessment
Client:	Stuart Richards
Instruction:	The instruction to undertake this Flood Consequences Assessment was received from the Client.
File Ref:	16236-FCA-01

Approval Record	
Author:	Adam McCulloch BSc (Hons)
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Approver:	Nigel Jones Beng (Hons) CEng MICE

	Document History	
Revision	**Date**	**Comment**
01	03/03/2025	First issue

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This report will remain valid for a period of twelve months (from the date of last issue) after which the source data should be reviewed in order to reassess the findings and conclusions on the basis of latest available information.

Contents

Introduction 1
Existing Conditions 1
Development Proposals 2
Flood Zone Category and Policy Context 2
Consultation 3
Sources of Flooding and Probability 4
Mitigation 10
Impact on Flood Risk Elsewhere 10
Justification 11
Conclusions 12
Recommendations 12

Appendices

Appendix A Location Plan & Aerial Image
Appendix B LiDAR Extract
Appendix C BGS Borehole Information
Appendix D DCWW Sewer Plan
Appendix E Proposed Development Plans
Appendix F NRW Maps & Correspondence
Appendix G Modelled Outputs

Tables

Table 1 – NRW Flooding from Reservoirs 10

Introduction

Waterco has been instructed to prepare a Flood Consequences Assessment (FCA) in respect of a proposed slurry lagoon at Porthygan Farm, Wrexham, LL13 0TP.

The purpose of this report is to outline the potential flood risk to the site, the impact of the proposed development on flood risk elsewhere, 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.

Existing Conditions

The site covers an area of approximately 277m² and is located at National Grid Reference (NGR) 338241, 346457. A location plan and an aerial image are included in Appendix A.

Online mapping (including Google Maps / Google Streetview imagery, accessed February 2025) shows that the site comprises agricultural land. The site is bordered by agricultural land to the north, east and south, and an agricultural yard and barn to the west. Access to the site is provided from the A525 west of Porthygan Farm.

Local Topography

Topographic levels to metres Above Ordnance Datum (m AOD) have been derived from a 1m resolution Natural Resources Wales (NRW) composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). A review of LiDAR data shows that the site slopes from approximately 18m AOD in the north-east to approximately 15m AOD in the south-west. A LiDAR extract is included in Appendix B.

Ground Conditions

The British Geological Survey (BGS) online mapping (1:50,000 scale) indicates that the site is underlain by river terrace deposits, generally comprising sand and gravel. The superficial deposits are identified as being underlain by the Kinnerton Sandstone Formation.

The geological mapping is available at a scale of 1:50,000 and as such may not be accurate on a site-specific basis.

The closest historical BGS borehole record (BGS reference: SJ34NE105) is located 150m south-west of the site and is included in Appendix C together with a borehole location plan. The borehole record identifies:

- Made ground (shale, ash and clay etc) from ground level to 1.5 metres below ground level (m.bgl).
- Red brown/grey mottled sandy clayey silt with lenses of sand, brown silty clay, stones and wood fragments from 1.5m.bgl to 3m.bgl.

Local Drainage

Public sewer records have been obtained from Dwr Cymru Welsh Water (DCWW) and are included in Appendix D. The DCWW sewer records show that there are no public sewers within the vicinity of the site.

Surface water from adjacent farm buildings discharges into an unnamed watercourse approximately 60m south of the site.

Development Proposals

The proposed development is for the erection of a concrete panelled slurry lagoon. Proposed development plans are included in Appendix E. The lagoon will be 4.1m high (from the base to the crest of the lagoon).

Land immediately north of the site is steeply sloping and the proposed slurry lagoon will be partially inset into the hillside.

Flood Zone Category and Policy Context

Flood Zone Category

The Welsh Government Development Advice Map, included in Appendix F, shows that the majority of the site is located within Flood Zone C2 – an area considered at flood risk, without significant defence infrastructure, with a 0.1% (1 in 1000) or greater annual probability of flooding. The north-western extent of the proposed slurry lagoon is located within Flood Zone A – an area considered to be at little or no risk of fluvial or tidal flooding, with a less than 0.1% (1 in 1000) annual probability of flooding.

The NRW 'Flood Map for Planning' (Appendix F) shows that the southernmost extent of the proposed slurry lagoon is located within Flood Zone 3 – an area considered to be at flood risk with a 1% (1 in 100) or greater annual probability of fluvial flooding, including the effects of climate change. The central extent of the proposed slurry lagoon is located within Flood Zone 2 – an area considered to be at flood risk with between a 1% and 0.1% annual probability of flooding, including the effects of climate change. The northernmost extent of the slurry lagoon is located within Flood Zone 1 - an area outside of the extreme flood extent, meaning it has a less than 0.1% annual probability of flooding, including the effects of climate change.

Development Vulnerability Classification

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

TAN15 states that less vulnerable developments can be considered in Flood Zone C2 subject to the application of the TAN15 Justification Test and satisfying specific TAN15 acceptability criteria.

Local Policy

The Wrexham County Borough Local Development Plan (adopted December 2023) contains the following policies relating to flood risk:

'Policy SP18: Climate Change

vi. Avoiding areas susceptible to flood risk in the first instance in accordance with the sequential approach set out in national guidance. Highly vulnerable development, as defined in TAN15: Development and Flood Risk, should not be located within zone C2;

vii. Preventing development that increases flood risk; and

viii. Assesses the potential effects of climate change when preparing a Flood Consequence Assessment for the site.'

The Dee Preliminary Flood Risk Assessment (December 2018) has been reviewed and informs this report.

Consultation

A pre-planning opinion request was submitted to NRW in January 2025. In their response, provided as Appendix F, NRW have stated that:

'***Flood Risk Management***
Our Flood Risk Map confirms the application site lies within Zone C2 of the Development Advice Maps (DAM) contained in Technical Advice Note (TAN) 15: Development and Flood Risk (2004). The Flood Map for Planning identifies the application site to be at risk of flooding and is within Flood Zones 2 and 3 (Rivers).

Section 6 of TAN15 requires the Local Planning Authority (LPA) to determine whether the development at this location is justified. Therefore, we refer you to the tests set out in section 6.2 of TAN15. If the LPA consider the proposal meets the tests set out in criteria (i) to (iii), then the final test (iv) is for you, the applicant to demonstrate through the submission of a Flood Consequences Assessment (FCA) that the potential consequences of flooding can be managed to an acceptable level.

We advise that any FCA submitted with your planning application should assess the risk of flooding from all sources. The BangorOnDee_5_V1.0_2012 Hydraulic modelling study was completed in 2012. An update was carried out in 2021 to apply the latest climate change allowance for the 0.1% AEP and 1% AEP undefended and defended scenarios. Any FCA should be informed by outputs from this study.

Due to the site's location we advise that any FCA considers whether the proposal could be located further north based on site levels or, depending on ground levels and quantification of any loss of flood storage, whether it could be elevated to reduce potential for flooding. Any such material used should be sourced from within/edge of the floodplain to ensure there is no net loss of flood storage.

We refer you to our website and Guidance Note 028 Modelling for Flood Consequence Assessments for further

advice.

Watercourses
An unnamed watercourse runs through (underneath) the site. A Flood Risk Activity Permit would be required for any works in, over, under or near a main river or flood defence, or within a flood plain. We refer you to our website for further advice.'

Sources of Flooding and Probability

Fluvial

The nearest watercourse is an unnamed watercourse located approximately 60m south of the slurry lagoon. The unnamed watercourse flows east in this location to its confluence with the River Dee. The River Dee is located approximately 425m south-east of the site and flows north-east in this location.

Fluvial flooding could occur if the River Dee overtopped its banks during or following an extreme rainfall event.

The NRW 'Recorded Flood Extents' map (Appendix F) indicates that the eastern extent of the site is located within a recorded flood extent. However, the historic flood extent appears inaccurate at the site as it extends to land approximately 5m higher than the Flood Zone 2 extent. The landowner has no records of previous flooding reaching the location of the proposed slurry lagoon.

NRW Model Results

Modelled outputs have been taken from the JBA Consulting Bangor-on-Dee Flood Risk Mapping Study (2012) and the NRW Bangor-on-Dee Standard of Protection Assessment update (2020). The model outputs have been processed to create flood depth and water level mapping, included as Appendix G.

The 2012 model, developed by JBA Consulting, considers defended and undefended scenarios and accounts for climate change. An undefended scenario represents the removal of all linear flood defences. Modelled outputs have been provided for the 1% Annual Exceedance Probability (AEP), 1% AEP plus climate change (CC), and 0.1% AEP events. The model also considers the impact of a breach at three possible locations during the defended 1% AEP event. The closest breach to the site is breach 2 and reflects a 40m wide gap in the raised wall immediately upstream (and forming part of) of Old Dee Bridge.

The 2020 model, developed by NRW, updated the defended scenarios of the 2012 model with updated methodologies and climate change allowances. Modelled outputs have been provided for the 1% AEP, 1% AEP plus 25% CC, 1% AEP plus 50% CC, and 0.1% AEP events. The assessment of the defended scenario is based on the updated 2020 model.

Defended Scenario

As shown in Figure 1, during the 1% AEP event, flooding is estimated in the southern extent of site. A maximum flood depth of 380mm is estimated with a maximum water level of 15.44m AOD. The majority of

the site is flood free.

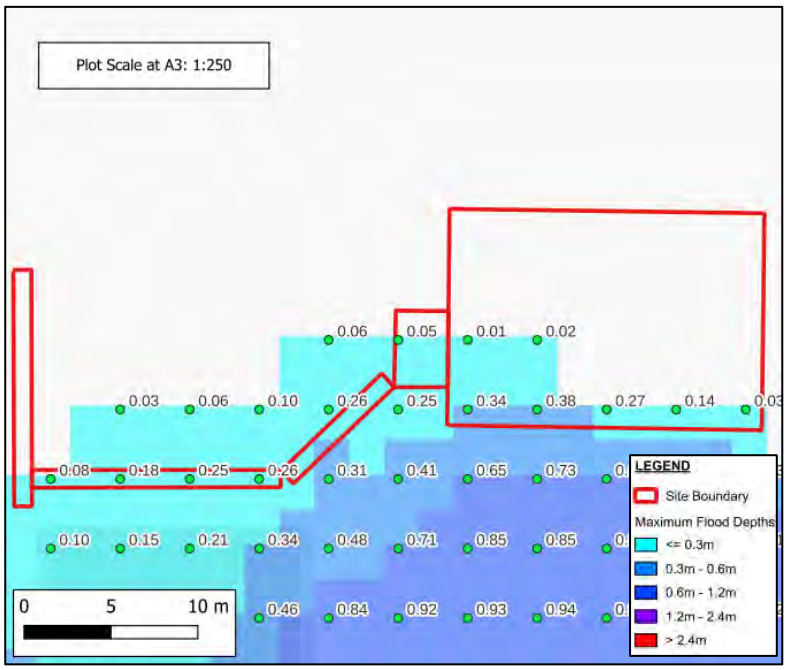


Figure 1 – 1% AEP – Maximum Flood Depth – Defended

As shown in Figure 2, during the 1% AEP plus 25% CC event, flooding is estimated in the southern extent of the site. A maximum flood depth of 580mm is estimated with a maximum water level of 15.64m AOD. The majority of the site is flood free.

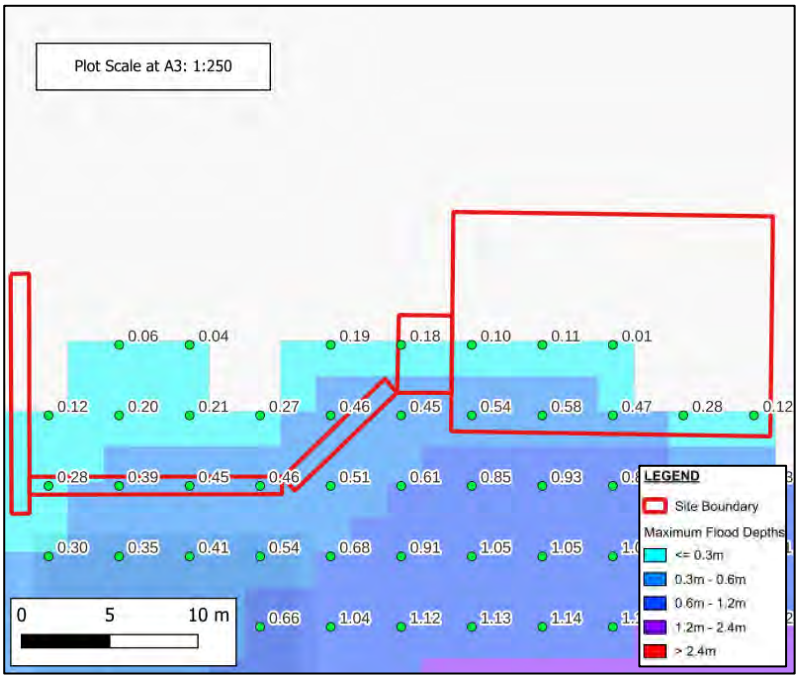


Figure 2 – 1% AEP + 25% CC – Maximum Flood Depth – Defended

As shown in Figure 3, during the 1% AEP plus 50% CC event, flooding is estimated in the southern extent of the site. A maximum flood depth of 820mm is estimated with a maximum water level of 15.88m AOD.

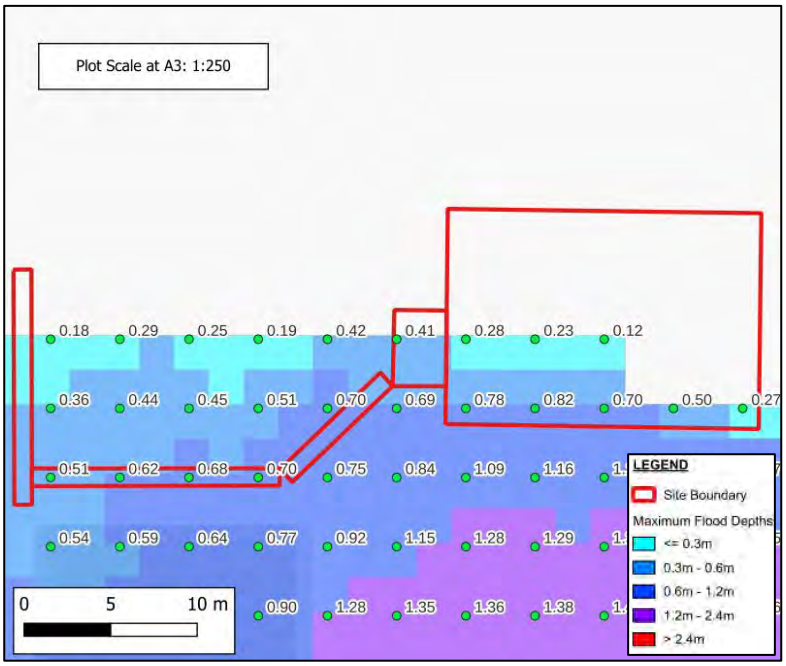


Figure 3 – 1% AEP + 50% CC – Maximum Flood Depth – Defended

As shown in Figure 4, during the 0.1% AEP event, flooding is estimated in the southern extent of the site. A maximum flood depth of 1.01m is estimated with a maximum flood level of 16.07m AOD.

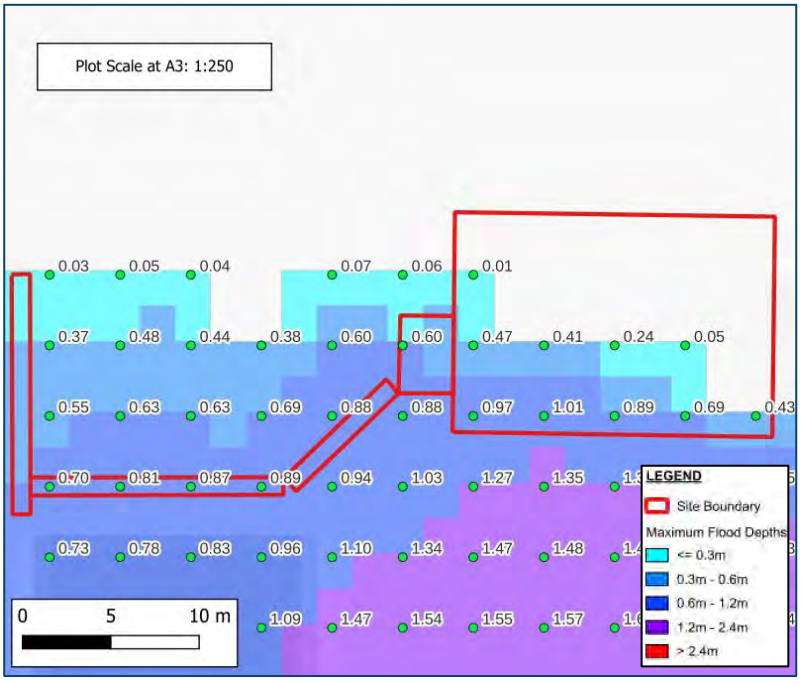


Figure 4 - 0.1% AEP (2020) - Maximum Flood Depth – Defended

Undefended

As shown in Figure 5, during the undefended 1% AEP event, flooding is estimated in the southern extent of the site. A maximum flood depth of 320mm is estimated.

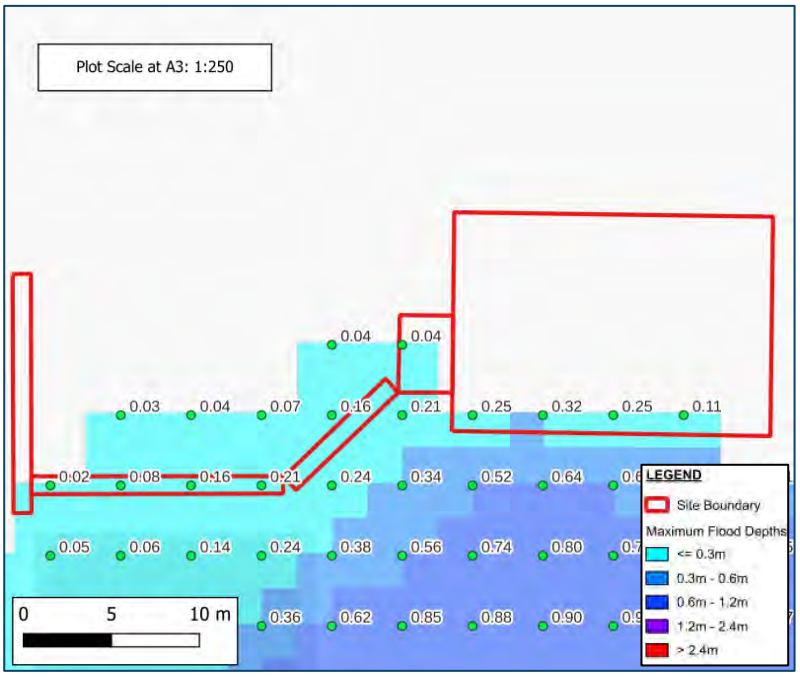


Figure 5 - 1% AEP - Maximum Flood Depth – Undefended

As shown in Figure 6, during the undefended 1% AEP + 20% CC event, flooding is estimated in the southern extent of the site. A maximum flood depth of 420mm is estimated.

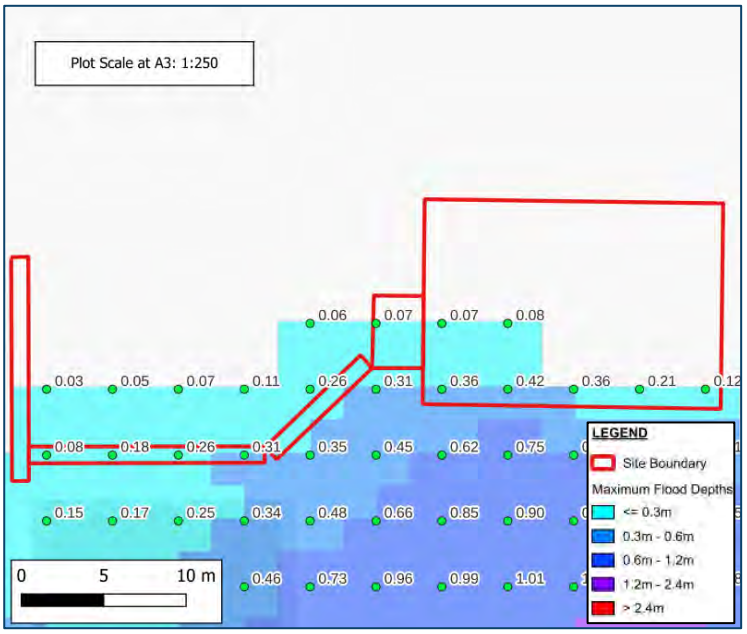


Figure 6 - 1% AEP + 20% CC - Maximum Flood Depth – Undefended

As shown in Figure 7, during the undefended 0.1% AEP event, a maximum flood depth of 910mm is estimated in the southern extent of the site.

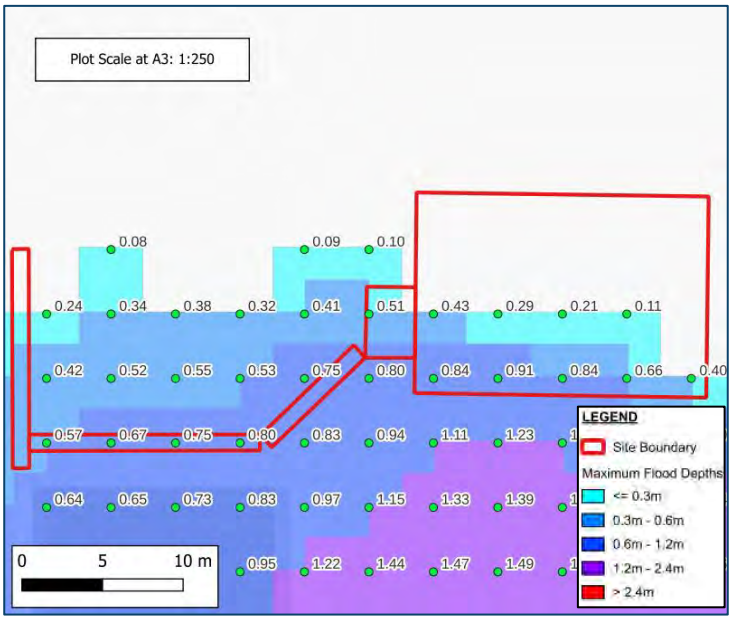


Figure 7 – 0.1% AEP – Maximum Flood Depth – Undefended

Breach

As shown in Figure 8, during the 1% AEP Old Dee Bridge breach event, flooding is estimated in the southern extents of the site. A maximum flood depth of 380mm is estimated. There is no difference in flood depths when comparing the defended 1% AEP event to the 1% AEP Old Dee Bridge breach event.

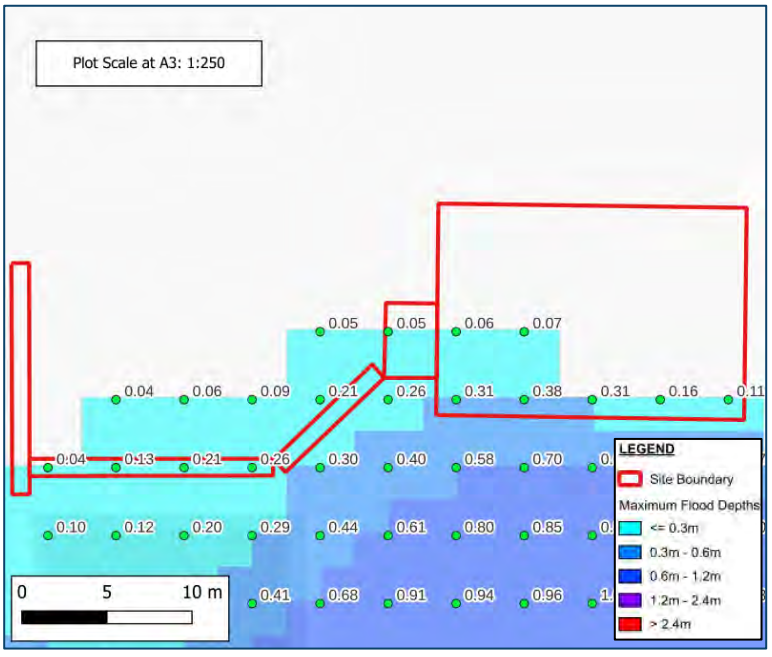


Figure 8 - 1% AEP (2012) – Maximum Flood Depth – Breach

It can be concluded that the southern extent of the location of the proposed slurry lagoon is estimated to flood. During the 1% AEP plus 50% CC event, a maximum flood depth of 820mm is estimated. During the 0.1% AEP event, a maximum flood depth of 1.01m is estimated. The majority of the site is flood free.

Tidal

The site is situated at a minimum of approximately 15m 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 Zones – Surface Water & Small Watercourses' map (Appendix F) shows that the site is located with Flood Zone 1, meaning it has a less than 0.1% annual probability of surface water flooding, including the effects of climate change.

There are no distinct flow routes in the area which would direct any potential surface water flooding towards the site.

There are no records of surface water flooding at or near to the site. It can therefore be concluded that the risk of surface water flooding is very low.

Sewer

The site is located in a rural area and there are no public sewers in the immediate vicinity of the site. The risk of sewer flooding is therefore considered to be very low.

Groundwater

Groundwater flooding occurs when water levels underneath 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.

As described above, the site is underlain by river terrace deposits, generally comprising sand and gravel. The site adjoins low lying land which forms part of the River Dee floodplain. As such, a high water table may be present when water levels in the River Dee are high.

The proposed slurry lagoon will be set into the hillside north of the site, however, it will not be set at an elevation lower than existing ground levels in the southern extent of the site.

There are no records of groundwater flooding at or near to the site. It can therefore be concluded that the risk of groundwater flooding is low.

Artificial Sources

There are no canals in the immediate vicinity of the site. The NRW 'Flood Risk from Reservoirs' map (Appendix F) shows that the site is at risk from a failure of the reservoirs summarised in Table 1.

Table 1 – NRW Flooding from Reservoirs

Name	Location (NGR)	Owner
Llyn Brenig	297471, 355680	Dŵr Cymru Welsh Water
Llyn Celyn	285981, 340563	Dŵr Cymru Welsh Water

NRW state that reservoir flooding is extremely unlikely to happen. All large reservoirs must be inspected and supervised by reservoir panel engineers. As the enforcement agency for the Reservoirs Act 1975 in Wales, NRW ensure that reservoirs are inspected regularly, and essential safety work is carried out. The probability of flooding from reservoirs is therefore very low.

The risk of flooding from artificial sources is therefore considered to be very low.

Summary of Potential Flooding

It can be concluded that fluvial flooding from the River Dee is the main potential source of flood risk at the site.

Mitigation

The site is identified at risk of fluvial flooding with a flood depth of 820mm in the southernmost extent during the defended 1% AEP plus 50% CC event.

The slurry lagoon will be a raised structure with a crest level approximately 4.1m above ground levels in the southern extent of the site. Given the raised nature of the structure and that the slurry lagoon will be watertight, floodwater will not reach a sufficient height to enter the lagoon.

Impact on Flood Risk Elsewhere

The extent of the slurry store in the flood extent is minimal (70m² during the 0.1% AEP event) and any flood storage lost would be negligible in context of the wider flood extent. Based on an average flood depth of 0.5m during the 0.1% AEP event, a potential flood storage volume of 35m³ could be lost as a result of the development.

Land between the site and the River Dee comprises agricultural land. The land between the site and River Dee within the flood extent covers an area of approximately 200,000m². Distributing the displaced flood storage of 35m³ over the 200,000m² flood extent (between the site and the River Dee) would result in a negligible increase in flood levels across the wider floodplain of 0.175mm. The proposed development would therefore have a negligible impact on flood risk elsewhere.

Justification

A slurry store is required on site to provide a minimum of five months slurry storage capacity in accordance with NRW Water Resources (Control of Agricultural Pollution) (Wales) Regulations 2021.

The proposed location of the slurry lagoon has been selected as the most practicable option within the farm. Alternative locations have been assessed however are shown to be unsuitable. The slurry lagoon cannot be placed further north (outside of the flood extent) due to the steeply sloping nature of the ground immediately north of the proposed slurry lagoon location.

The slurry store will be designed to meet the requirements set out in the NRW Silage, Slurry and other livestock manure storage guidance. The slurry store is considered to be justified in this location as it is required within close proximity to the existing cow sheds.

Conclusions

The proposed development is for the erection of a slurry lagoon.

The site is partially located within Flood Zone C2 on the Welsh Government Development Advice Map –an area considered to be at flood risk, without significant defence infrastructure, with a 0.1% (1 in 1000) or greater annual probability of flooding.

The main potential source of flooding at this site is fluvial flooding from the River Dee. The risk of flooding from all other sources has been assessed and the risk is considered to be low.

during the 1% AEP plus 25% CC event, flooding is estimated in the southern extent of the site. A maximum flood depth of 580mm is estimated with a maximum water level of 15.64m AOD. During the 1% AEP plus 50% CC event, a maximum flood depth of 820mm is estimated in the southern extent of the slurry lagoon with a flood level of 15.88m AOD.

The slurry lagoon will be a raised structure with a crest level approximately 4.1m above ground levels in the southern extent of the site. Given the raised nature of the structure and that the slurry lagoon will be watertight, floodwater will not reach a sufficient height to enter the lagoon.

The extent of the slurry store in the flood extent is minimal (70m² during the 0.1% AEP event) and any flood storage lost would be negligible in context of the wider flood extent. Distributing the displaced flood storage of 35m³ over the 200,000m² flood extent (between the site and the River Dee) would result in a negligible increase in flood levels across the wider floodplain of 0.175mm. The proposed development would therefore have a negligible impact on flood risk elsewhere.

Recommendations

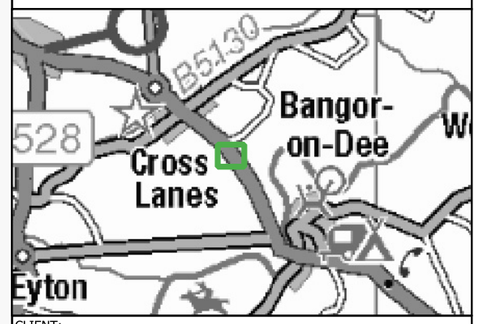
1. Submit this Flood Consequences Assessment to the Planning Authority in support of the Planning Application.

Appendix A 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
- Waterbodies



0 50 100 150 200 250 m

CLIENT:
Stuart Richards

waterco
www.waterco.co.uk

SCHEME:
Porthygan Farm, Wrexham

PLOT TITLE:
Location Plan

PLOT STATUS:	DATE:
FINAL	18-02-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:1000

PLOT NAME:	REVISION:
16236_Location_Plan	-

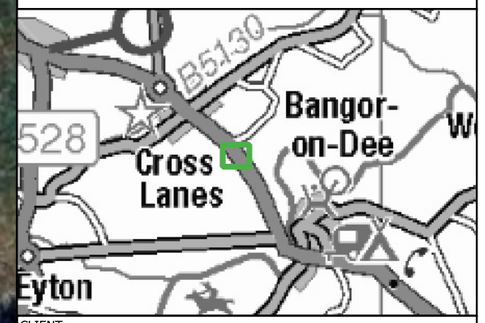
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Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

Site Boundary



CLIENT:

Stuart Richards

waterco

www.waterco.co.uk

SCHEME:

Porthygan Farm, Wrexham

PLOT TITLE:

Aerial Plan

PLOT STATUS:	DATE:
FINAL	18-02-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:1000

PLOT NAME:	REVISION:
16236_Aerial_Plan	-

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Appendix B LiDAR Extract

Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

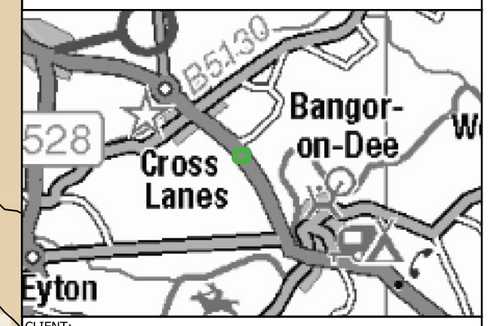
LEGEND

- Site Boundary
- Site Levels (m AOD)

Ground Elevations (m AOD)

- <= 15
- 15 - 20
- 20 - 25
- 25 - 30
- > 30

17.35
17.79
16.02
15.25
15.74



0 10 20 30 40 50 m

CLIENT:
Stuart Richards

www.waterco.co.uk

SCHEME:
Porthygan Farm, Wrexham

PLOT TITLE:
LiDAR Plan
1m Resolution
Data from Natural Resources Wales

PLOT STATUS:			DATE:
FINAL			25-02-2025
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:500
PLOT NAME:			REVISION:
16236_LiDAR_Plan			-

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Appendix C BGS Borehole Information

BGS ID: 153275 : BGS Reference: SJ34NE105
British National Grid (27700) : 338180,346300

SMD No. 700

Cementation Ground Engineering

SJ 34 NE 105

soil mechanics department

BOREHOLE No. 30

CONTRACT	BANGOR-ON-DEE BY-PASS.
Client	Flintshire County Council.
Site Address	Bangor-on-Dee, Flintshire.

REPORT No. 4501/73/EJ

Ground Level 15.60 m.O.D.
Cha./Co-ords. 2400 m.

Boring Commenced 24.10.73
Boring Completed 24.10.73

Shell & Auger Boring 200 mm. dia. to 3.00 m. mm. dia. to m.
Rotary Drilling dia. to m. Circulation Fluid–
dia. to m. Circulation Fluid–

	Strikes	Inflow	Sealed at	Date					
Ground Water Record	None m.		m.	Hole Depth					
	m.		m.	Casing Depth					
	m.		m.	Water Level					

Remarks

Description	Depth	Sample Ref. No.	Type	Sample Taken From m.	Sample Taken To m.	N blows/ 0.3m.
Made ground (shale, ash and clay, etc.).		3036	J	1.00		
	1.50	3037	J	1.50		
Red-brown/grey mottled sandy clayey silt with lenses of sand, brown silty clay, occasional stones and wood fragments.		3038	U	1.50	1.95	
		3039	J	2.50		
		3040	U	2.50	2.95	
	3.00	3041	J	3.00		

Scale 20mm = 1 m

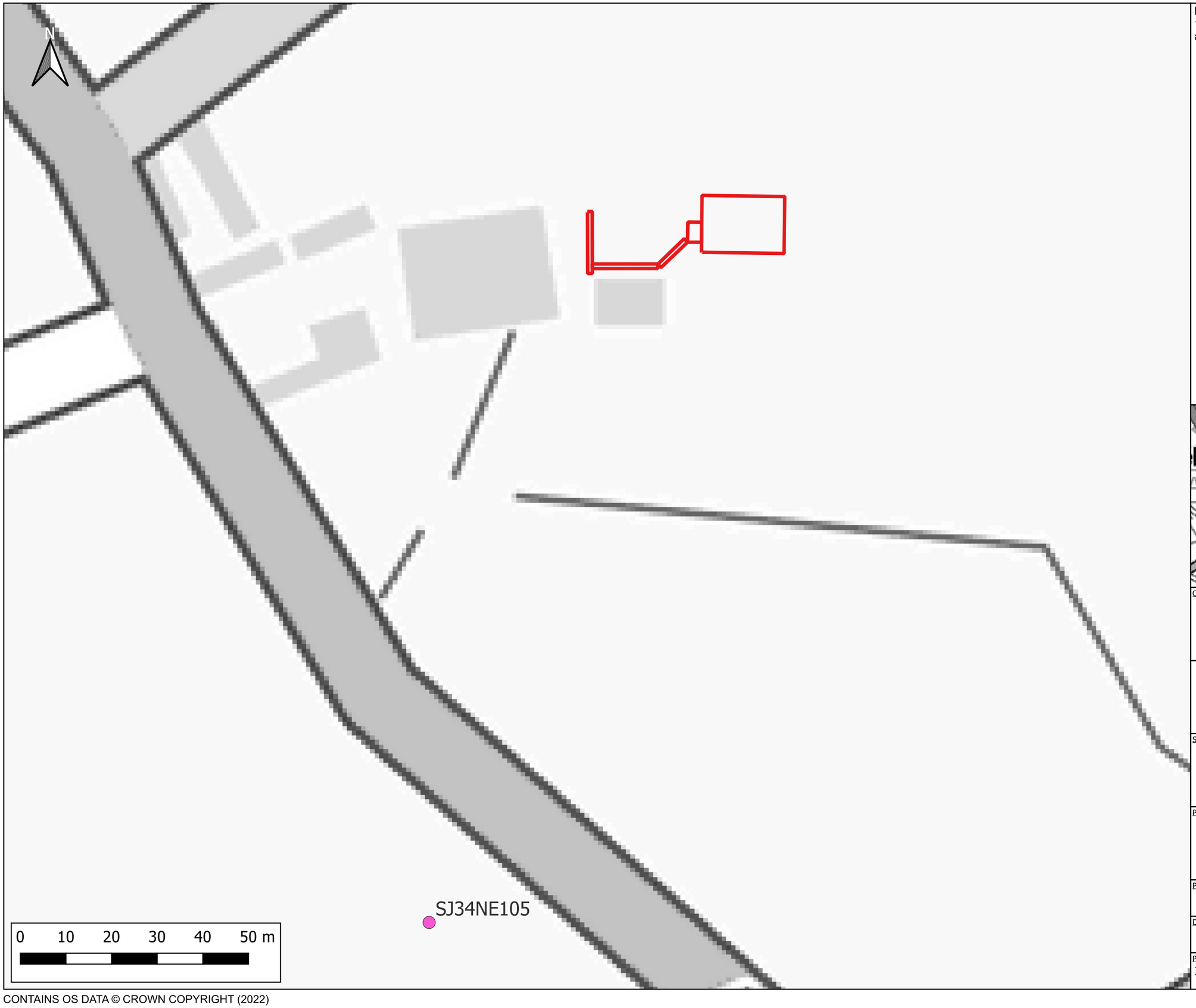
Notes

Driller :

Sheet No.

CODES: U-Undisturbed Sample, P-Piston Sample, D-Large Disturbed Sample, J-Jar Sample, W-Water Sample
=] Length of Core Run + Extrapolated 'N' Value

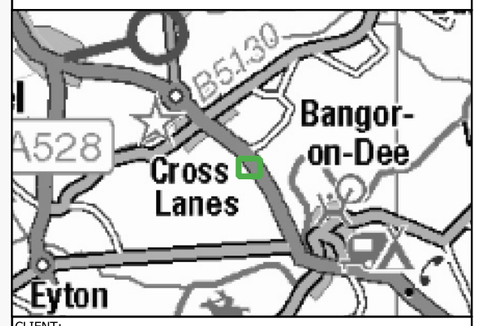
Contact BGS: ngdc@bgs.ac.uk



Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- BGS Borehole Location



CLIENT:

Stuart Richards

waterco

www.waterco.co.uk

SCHEME:

Porthygan Farm, Wrexham

PLOT TITLE:

Historical BGS Borehole Location Plan
Data from the British Geological Survey (BGS)

PLOT STATUS:	DATE:
FINAL	25-02-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:800

PLOT NAME:	REVISION:
16236_BGS_Borehole_Location_Plan	-

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Appendix D DCWW Sewer Plan

Dŵr Cymru
Welsh Water

Porthygan Farm, Wrexham LL13 0TP

N
W E
S

LEGEND(Representative of most common features)

Waste network:

- Foul chamber
- Surface water chamber
- Combined chamber
- Combined sewer overflow
- Special purpose chamber
- Treatment works
- Pumping station
- Outfall
- Lamphole (LH)
- Storm Overflow
- Rising main
- Gravity sewer
- Private sewer
- Private sewer subject to Sect. 104 adoption agreement (S 104)
- Private Sewer Transfer
- Lateral Drain
- Inspection Chamber

NB: Sewer symbol colour indicates the type.

RED - Combined
GREEN - Surface Water
BROWN - Foul
Purple - Former 524 sewers (for indicative purposes only)

Notes:

Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases, pipe material (other than Asbestos Cement or Pitch Fibre) may be found to be asbestos cement (AC) or Pitch Fibre (PF) . It is therefore advisable that the possible presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation

Dŵr Cymru Cyfyngedig ('the Company') gives this information as to the position of its underground apparatus by way of general guidance only. The Company does not warrant that it is base information of the underground apparatus or as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the company's apparatus. The onus of locating apparatus before carrying out any excavations rests entirely on you. The information which is supplied by the Company, is done so in accordance with statutory requirements of sections 198 and 199 of the Water Industry Act 1991 which is based upon the best Information available and, in particular, but without prejudice to the generality of the foregoing, it should be noted that the records that are available to the Company may not disclose the existence of a water main, service pipe, sewer, lateral drain or disposal main and any associated apparatus laid before 1 September 1989, or, if they do, the particulars thereof including their position underground may not be accurate. It must be understood that the furnishing of this information is entirely without prejudice to the provision of the New Roads and Street Works Act 1991 and the Company's right to be compensated for any damage to its apparatus.

Service pipes are not generally shown but their presence should be anticipated.

EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.

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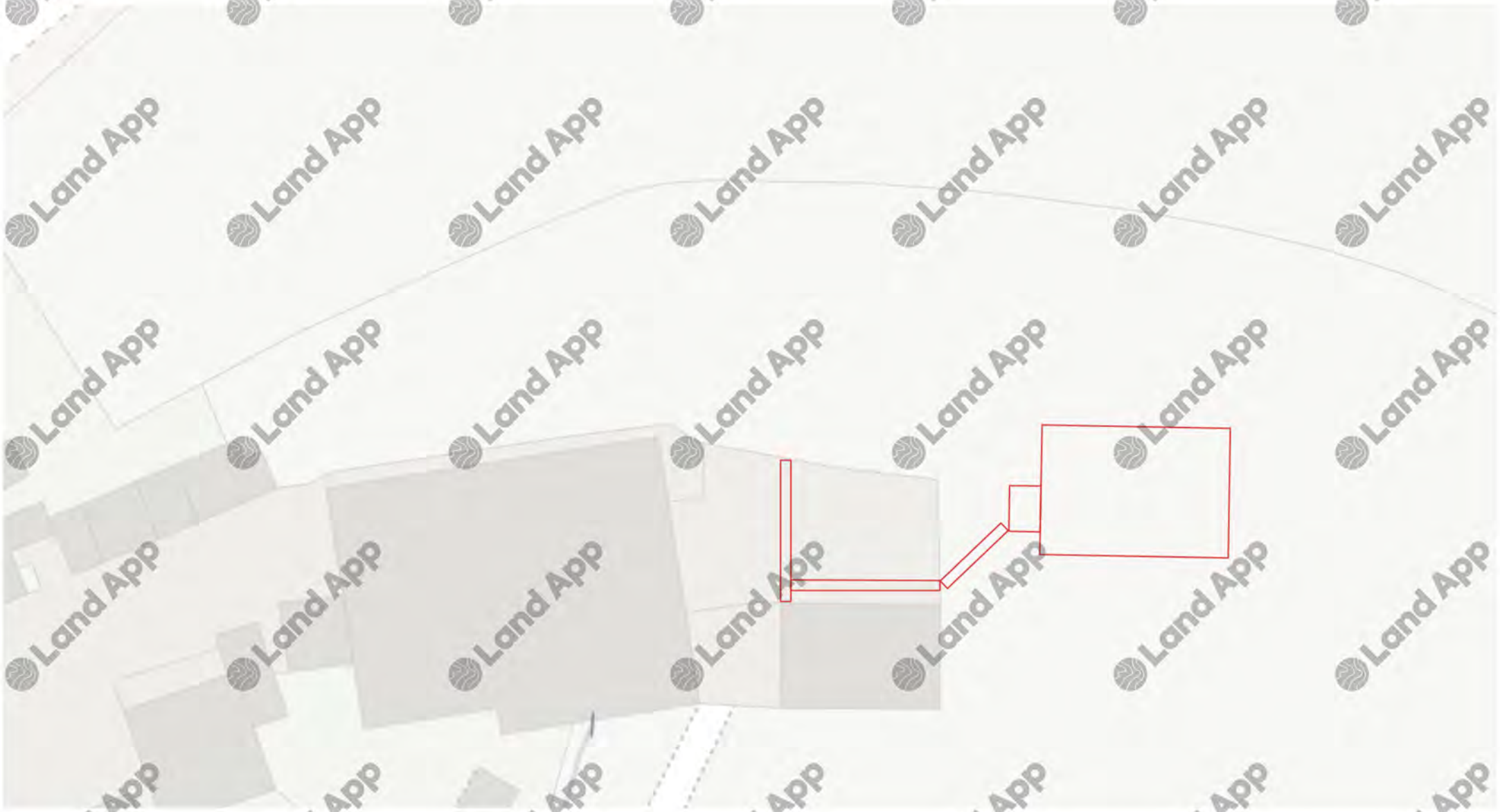
Map Ref:	338289,346419
Map scale:	1:1250
Printed by:	Emily Marsden
Printed on:	11 Feb 2025

Appendix E Proposed Development Plans

SELBY RURAL

DRAFT SITE PLAN

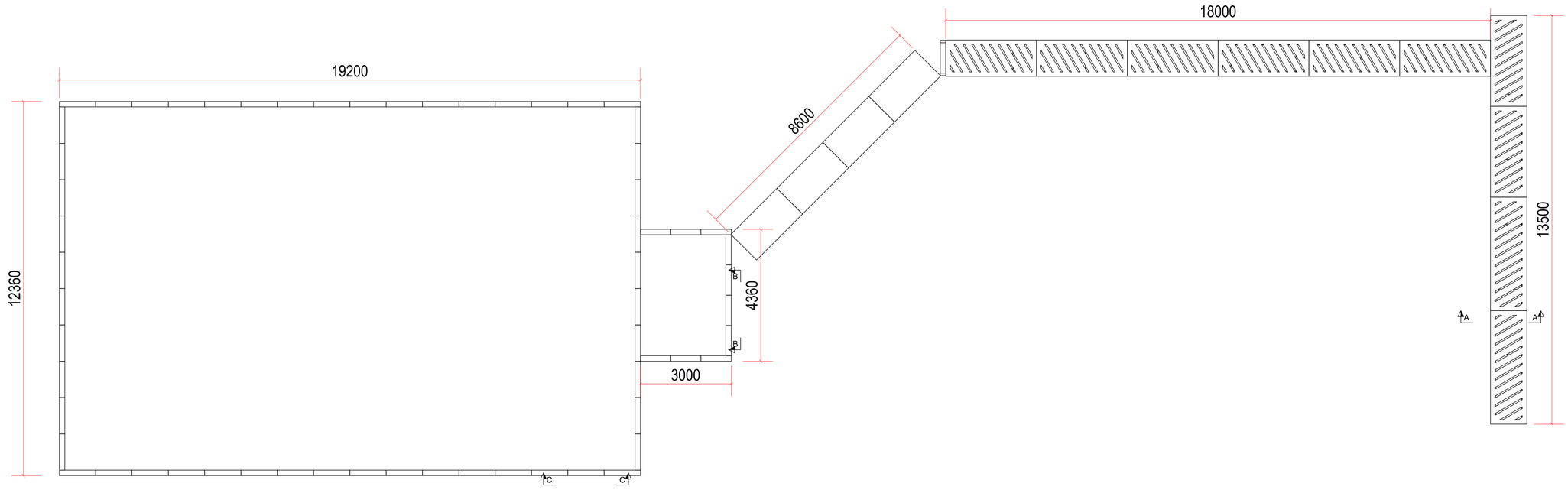
Land App



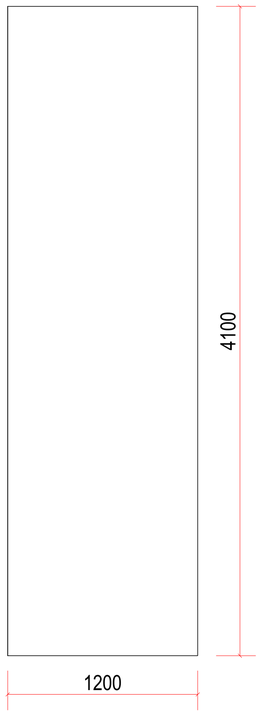
Produced on Land App, Jan 30, 2025.
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10 m
Scale 1:500 (at A4)

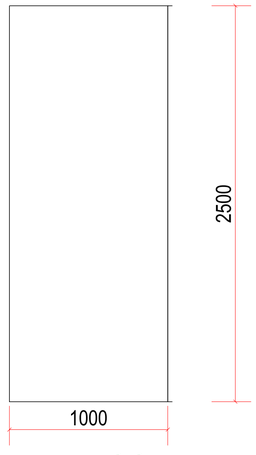
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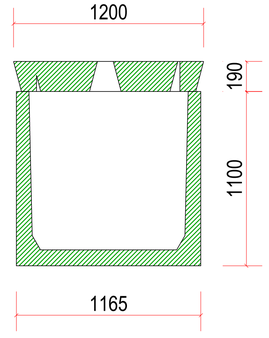
3d



C - C



B - B



A - A

REV MARK	REVISION DESCRIPTION	REVISION DATE

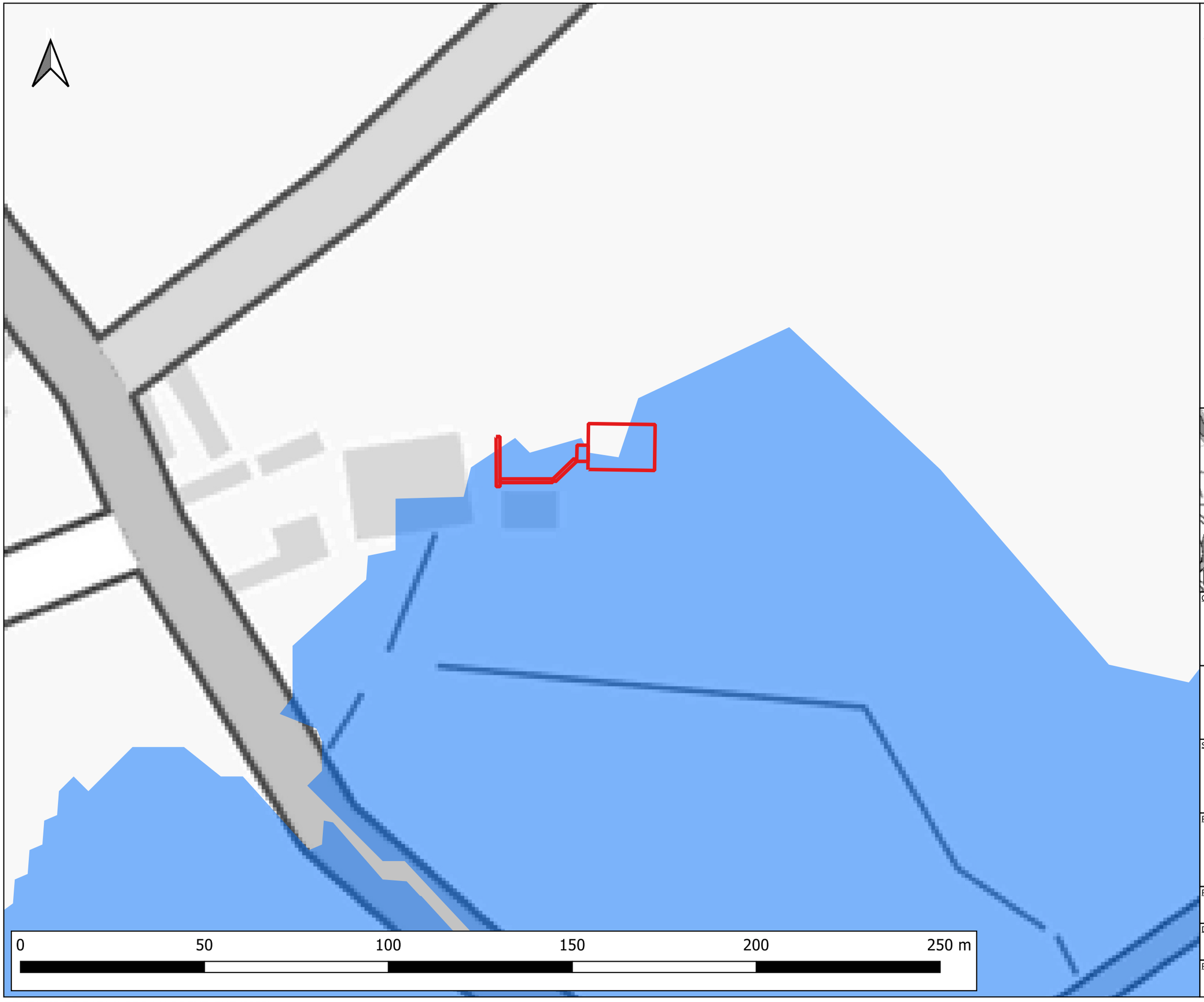
Stuart Richards

Porthygan

DOCUMENT NUMBER			
DRAWING TITLE	Overview		
CONTRACT	Slurry Transfer & Collection		
MODELLED BY	JEM	**ISSUE DATE**	
CONTRACT NO		**SCALE**	1:20 1:80
DRAWING No	G [2]	**REVISION No.**	

Tekla Structures

Appendix F NRW Maps & Correspondence



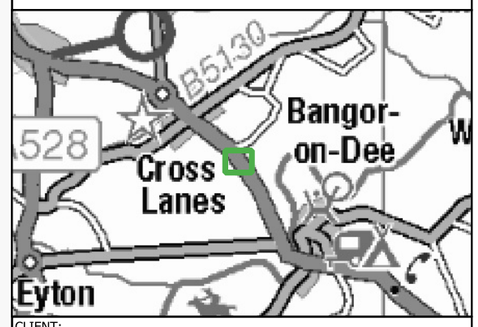
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary

Development Advice Map (TAN15)

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



CLIENT:

Stuart Richards

waterco

www.waterco.co.uk

SCHEME:

Porthygan Farm, Wrexham

PLOT TITLE:

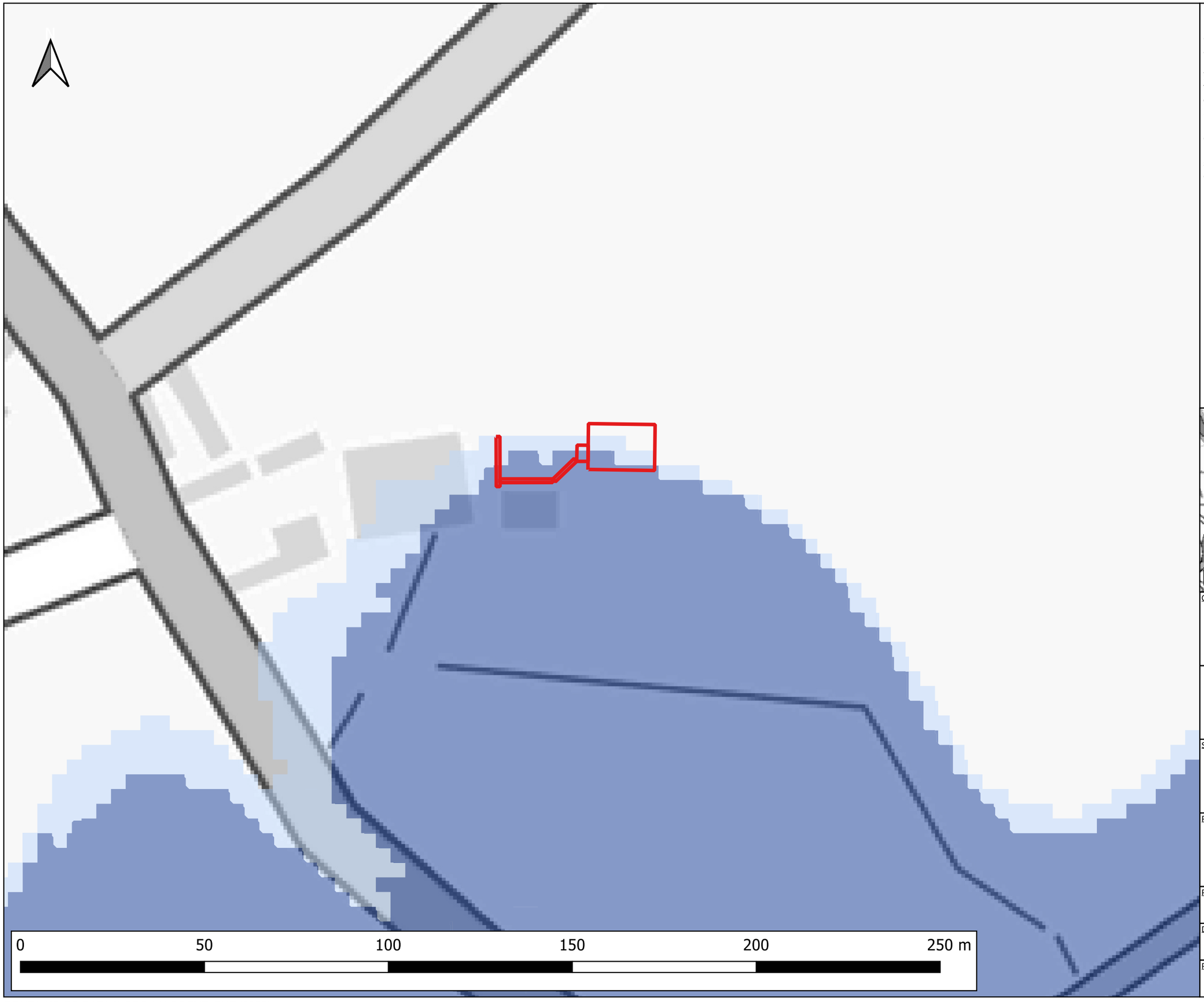
NRW Development Advice Map
Data published October 2022

PLOT STATUS:	DATE:
FINAL	18-02-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:1000

PLOT NAME:	REVISION:
16236_NRW_DAM_Map	-

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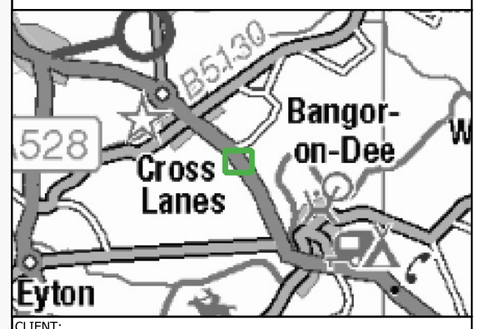
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise
2) Flood Zone 3 displays the extent of flooding from rivers with a 1% AEP or greater of flooding in a given year including and allowance for climate change and the sea with a 0.5% AEP or greater of flooding in a given year including and allowance for climate change
3) Flood Zone 2 displays the extent of flooding from rivers with a less than 1% AEP but greater than or equal to 0.1% AEP of flooding in a given year including and allowance for climate change and the sea with a less than 0.5% AEP but greater than or equal to 0.1% AEP of flooding in a given year including and allowance for climate change.

LEGEND

- Site Boundary

NRW Flood Map for Planning

- Flood Zone 1
- Flood Zone 2
- Flood Zone 3



CLIENT:

Stuart Richards

waterco

www.waterco.co.uk

SCHEME:

Porthygan Farm, Wrexham

PLOT TITLE:

NRW Flood Map for Planning (Rivers and Sea)
Data published November 2024

PLOT STATUS:			DATE:
FINAL			18-02-2025
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:1000
PLOT NAME:			REVISION:
16236_NRW_FMfP			-

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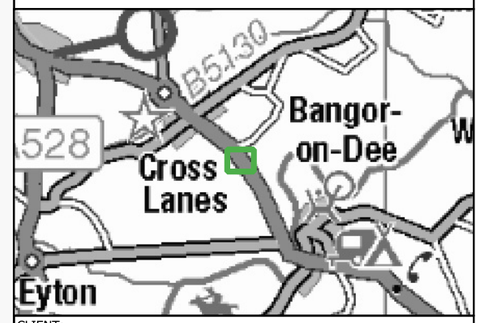
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary

Flood Zones Rivers

- Flood Zone 1
- Flood Zone 2
- Flood Zone 3



0 50 100 150 200 250 m

CLIENT:

Stuart Richards

waterco

www.waterco.co.uk

SCHEME:

Porthygan Farm, Wrexham

PLOT TITLE:

NRW Flood Risk from Rivers
Data published November 2024

PLOT STATUS:	DATE:
FINAL	18-02-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:1000

PLOT NAME:	REVISION:
16236_NRW_Flood_Risk_from_Rivers	-

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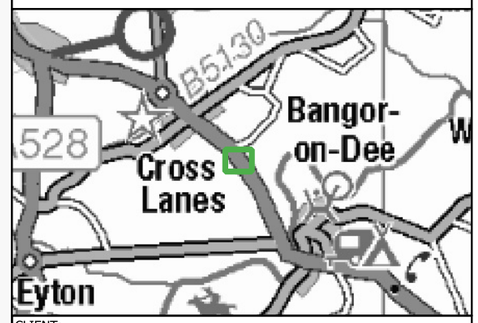
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary

Flood Zones - Surface Water & Small Watercourses

- Flood Zone 1
- Flood Zone 2
- Flood Zone 3



0 50 100 150 200 250 m

CLIENT:
Stuart Richards

waterco
www.waterco.co.uk

SCHEME:
Porthygan Farm, Wrexham

PLOT TITLE:
NRW Flood Zones - Surface Water & Small Watercourses
Data published November 2024

PLOT STATUS:			DATE:
FINAL			18-02-2025
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AM	AW	NJ	1:1000

PLOT NAME:	REVISION:
16236_NRW_Flood_Risk_from_Surface_Water	-

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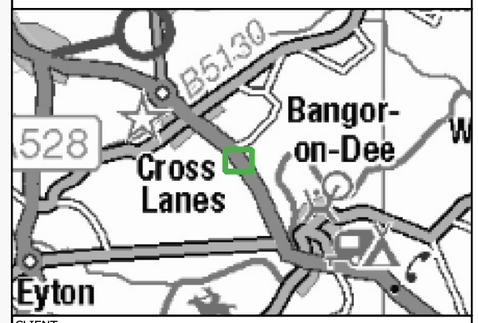
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary

Flood Risk from the Sea

- Flood Zone 1
- Flood Zone 2
- Flood Zone 3



0 50 100 150 200 250 m

CLIENT:

Stuart Richards

www.waterco.co.uk

SCHEME:

Porthygan Farm, Wrexham

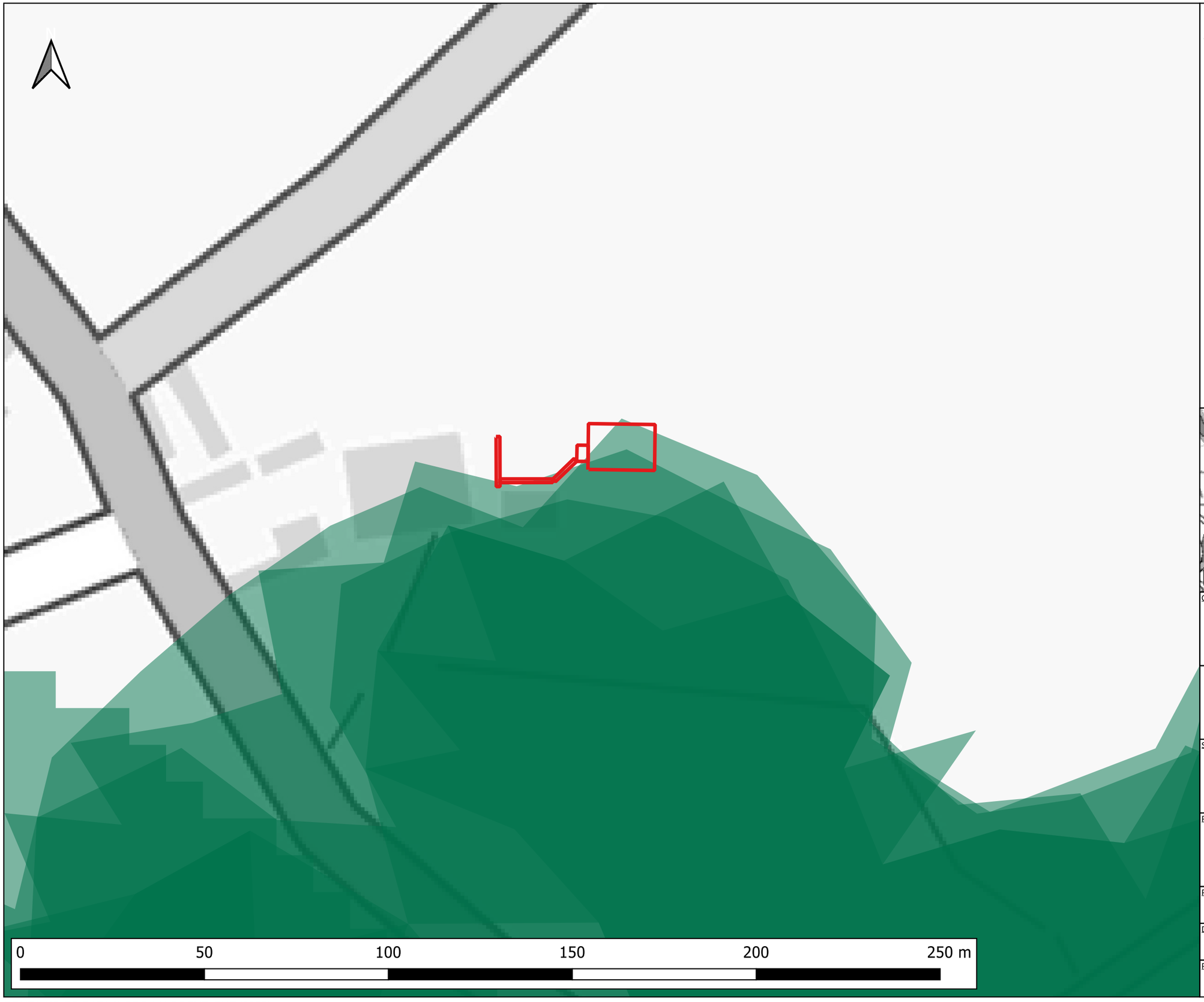
PLOT TITLE:

NRW Flood Risk from the Sea
Data published November 2024

PLOT STATUS:			DATE:
FINAL			18-02-2025
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:1000

PLOT NAME:	REVISION:
16236_NRW_Flood_Risk_from_the_Sea	-

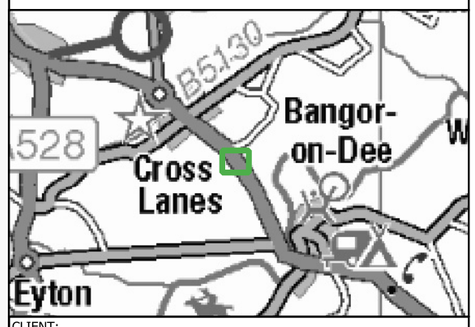
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Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- Flood Risk from Reservoirs Extent



CLIENT:

Stuart Richards

waterco

www.waterco.co.uk

SCHEME:

Porthygan Farm, Wrexham

PLOT TITLE:

NRW Flood Risk from Reservoirs
Data published February 2017

PLOT STATUS:	DATE:
FINAL	18-02-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:1000

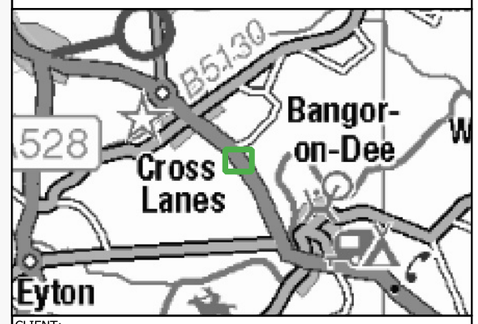
PLOT NAME:	REVISION:
16236_NRW_Flood_Risk_from_Reservoirs	-

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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
- NRW Recorded Flood Extents



0 50 100 150 200 250 m

CLIENT:
Stuart Richards

www.waterco.co.uk

SCHEME:
Porthygan Farm, Wrexham

PLOT TITLE:
NRW Recorded Flood Extents
Data published November 2024

PLOT STATUS:			DATE:
FINAL			18-02-2025
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:1000
PLOT NAME:			REVISION:
16236_Recorded_Flood_Extents			-

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Cyfoeth Naturiol Cymru
Natural Resources Wales

Ein cyf/Our ref: CAS-273106-Q8D5
Eich cyf/Your ref: 16236

adam.mcculloch@waterco.co.uk

Date: 28 January 2025

Dear Sir,

PROPOSAL: PROPOSED SLURRY LAGOON

LOCATION: PORTHYGAN FARM, WREXHAM, LL13 0TP

Thank you for consulting Cyfoeth Naturiol Cymru (CNC)/Natural Resources Wales (NRW) about the above pre-application enquiry, which we received on 22 January 2025.

We have considered your enquiry in relation to our Development Planning Consultations Topics document (September 2018). We advise the following matters are relevant to your site / proposed development and suggest you consider these further prior to the submission of any planning application:

Flood Risk Management

Our Flood Risk Map confirms the application site lies within Zone C2 of the Development Advice Maps (DAM) contained in Technical Advice Note (TAN) 15: Development and Flood Risk (2004). The Flood Map for Planning identifies the application site to be at risk of flooding and is within Flood Zones 2 and 3 (Rivers).

Section 6 of TAN15 requires the Local Planning Authority (LPA) to determine whether the development at this location is justified. Therefore, we refer you to the tests set out in section 6.2 of TAN15. If the LPA consider the proposal meets the tests set out in criteria (i) to (iii), then the final test (iv) is for you, the applicant to demonstrate through the submission of a Flood Consequences Assessment (FCA) that the potential consequences of flooding can be managed to an acceptable level.

We advise that any FCA submitted with your planning application should assess the risk of flooding from all sources. The BangorOnDee_5_V1.0_2012 Hydraulic modelling study was completed in 2012. An update was carried out in 2021 to apply the latest climate change allowance for the 0.1% AEP and 1% AEP undefended and defended scenarios. Any FCA should be informed by outputs from this study. These data can be requested from our data distribution team at: datadistribution@naturalresourceswales.gov.uk.

Due to the site's location we advise that any FCA considers whether the proposal could be located further north based on site levels or, depending on ground levels and quantification of any loss of flood storage, whether it could be elevated to reduce potential for flooding. Any such material used should be sourced from within/edge of the floodplain to ensure there is no net loss of flood storage.

We refer you to our website and Guidance Note 028 *Modelling for Flood Consequence Assessments* for further advice.

Watercourses

An unnamed watercourse runs through (underneath) the site. A Flood Risk Activity Permit would be required for any works in, over, under or near a main river or flood defence, or within a flood plain. We refer you to our website for further advice.

European Protected Species (EPS)

Our records show there may be protected species within the vicinity of the site (otter, great crested newt). We advise liaison with the LPA's ecologist to discuss and agree the scope of any surveys required. We refer you to our website for further advice.

Protected Sites

We note the application site is within the catchment of the River Dee and Bala Lake Special Area of Conservation (SAC). In line with our *Advice to Planning Authorities for Planning Applications Affecting Nutrient Sensitive River Special Areas of Conservation* (June 2024), under the Habitats Regulations, Planning Authorities must consider the impact of proposed developments on water quality within SAC river catchments.

We therefore advise that as part of any future planning application submission, you provide the LPA with sufficient details to confirm whether or not any additional wastewater would be discharged from the site. If additional wastewater is to be discharged, it is likely the LPA will require further information from you to inform their Habitats Regulations Assessment (HRA).

Source Protection Zones

The site lies within the Cott Beverages Source Protection Zone (SPZ). Source Protection Zones are designated zones around public water supply abstractions and other sensitive receptors and are intended to highlight the areas in which certain activities may pose an unacceptable risk of pollution. We refer you to our website for further advice.

Groundwater Protection and Land Contamination

The site lies above a designated principal bedrock aquifer. Advice on environmental considerations and the assessments needed to support your planning application can be found on our external website.

- For advice on how to deal with possible land contamination on your development visit: http://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/advice-for-developers/land-contamination/?lang=en

- For advice on how to protect groundwater at your development visit: http://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/advice-for-developers/protecting-groundwater/?lang=en

Agriculture

The facilities must comply with The Water Resources (Control of Agricultural Pollution) (Wales) Regulations 2021. Site operators should ensure that there is no possibility of contaminated water entering and polluting surface or groundwater. Further information is available on our website at Natural Resources Wales / Silage and slurry storage.

Provision of Data

In addition to the above, please note, we can also provide certain data free of charge, as set out in our Open Data Policy. Customers can access our data via our website.

Other Matters

Please note, the view expressed in this letter is a response to a pre-planning enquiry only. We trust these comments will prove helpful, but they should not set a precedent for any future Natural Resources Wales' response to any formal application for planning permission or other legal consent. Such applications shall be assessed on the information submitted and regulations of relevance at that time. The details contained in this letter are based on the information available to date.

As part of our discretionary advice service we can provide further advice relating to land contamination, groundwater and flood risk prior to your planning application being submitted. There is a charge for this service. Further details are available on our website.

If you have any queries on the above, please do not hesitate to contact us.

Yours faithfully,

Ruth Prichard
Cynghorydd - Cynllunio Datblygu/Advisor - Development Planning
Cyfoeth Naturiol Cymru/Natural Resources Wales

E-bost/E-mail: northplanning@cyfoethnaturiolcymru.gov.uk

Croesewir gohebiaeth yn Gymraeg a byddwn yn ymateb yn Gymraeg, heb i hynny arwain at oedi./Correspondence in Welsh is welcomed, and we will respond in Welsh without it leading to a delay.

Appendix G Modelled Outputs

Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary

Maximum Flood Depths

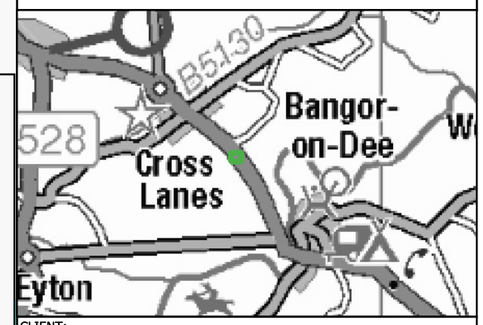
- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m

Plot Scale at A3: 1:250

0 10 20 m

0 5 10 m

0.06 0.05 0.01 0.02
0.03 0.06 0.10 0.26 0.25 0.34 0.38 0.27 0.14 0.03
0.01 0.08 0.18 0.25 0.26 0.31 0.41 0.65 0.73 0.68 0.59 0.53
0.13 0.10 0.15 0.21 0.34 0.48 0.71 0.85 0.85 0.86 0.92 0.91
0.24 0.46 0.84 0.92 0.93 0.94 0.99 1.05 1.02



CLIENT:
Stuart Richards

www.waterco.co.uk

SCHEME:
Porthygan Farm, Wrexham

PLOT TITLE:
Maximum Flood Depth
1% AEP Fluvial Event
Existing Scenario
Defended Scenario 2020

PLOT STATUS:	DATE:
FINAL	03-03-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:400

PLOT NAME:	REVISION:
16236_BoD2020_Q100_d_Max	-

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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

Maximum Flood Depths

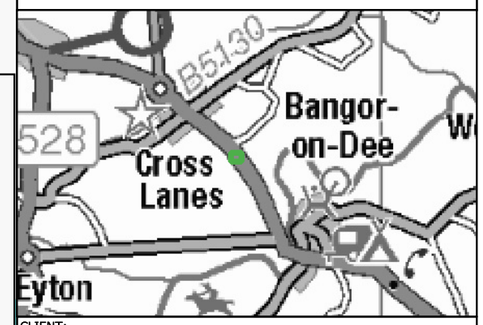
- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m

0 10 20 m

Plot Scale at A3: 1:250

15.44

0 5 10 m



CLIENT:
Stuart Richards

waterco
www.waterco.co.uk

SCHEME:
Porthygan Farm, Wrexham

PLOT TITLE:
Maximum Water Level (m AOD)
1% AEP Fluvial Event
Existing Scenario
Defended Scenario 2020

PLOT STATUS:	DATE:
FINAL	03-03-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:400

PLOT NAME:	REVISION:
16236_BoD2020_Q100_h	-

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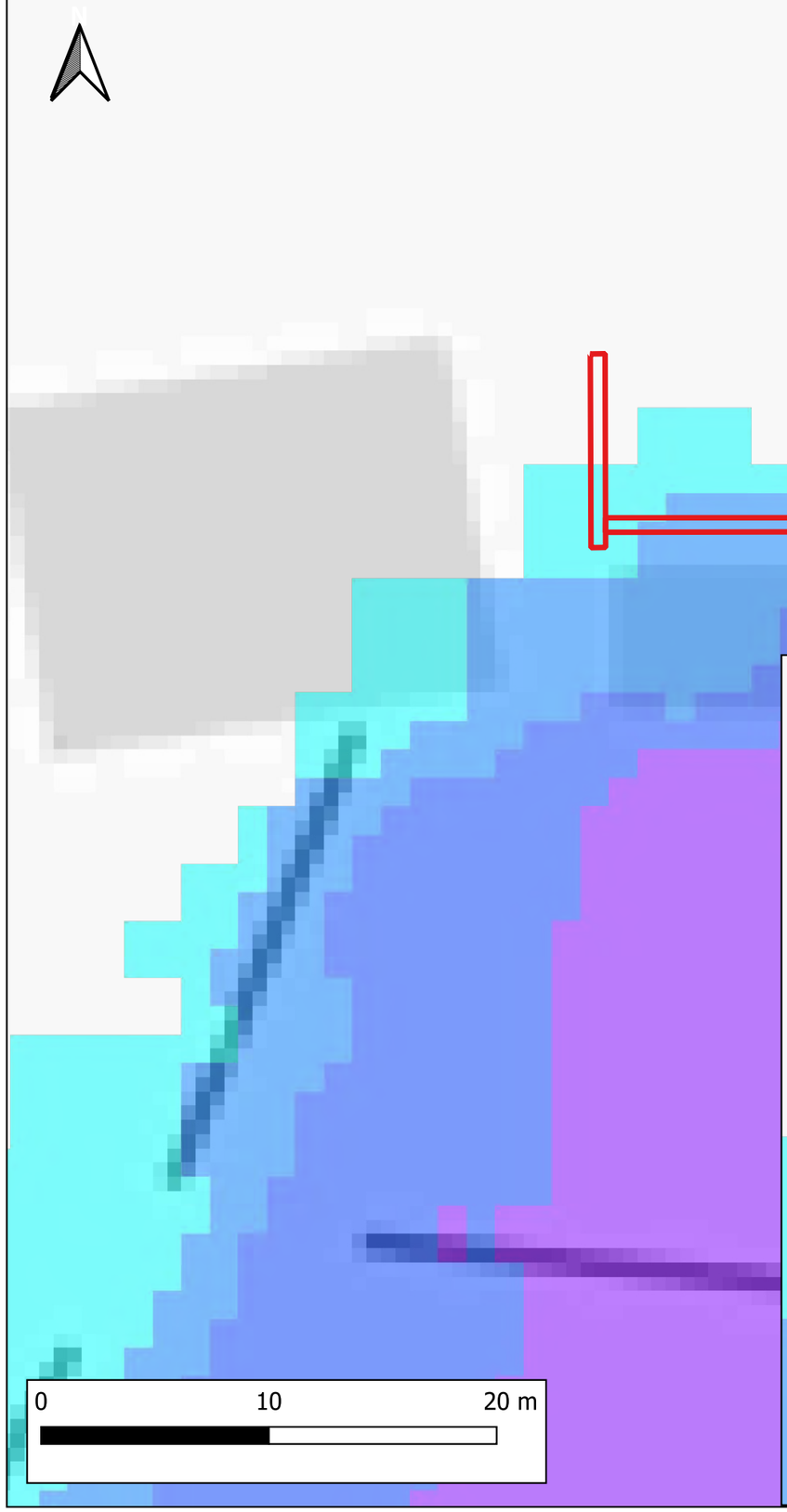
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

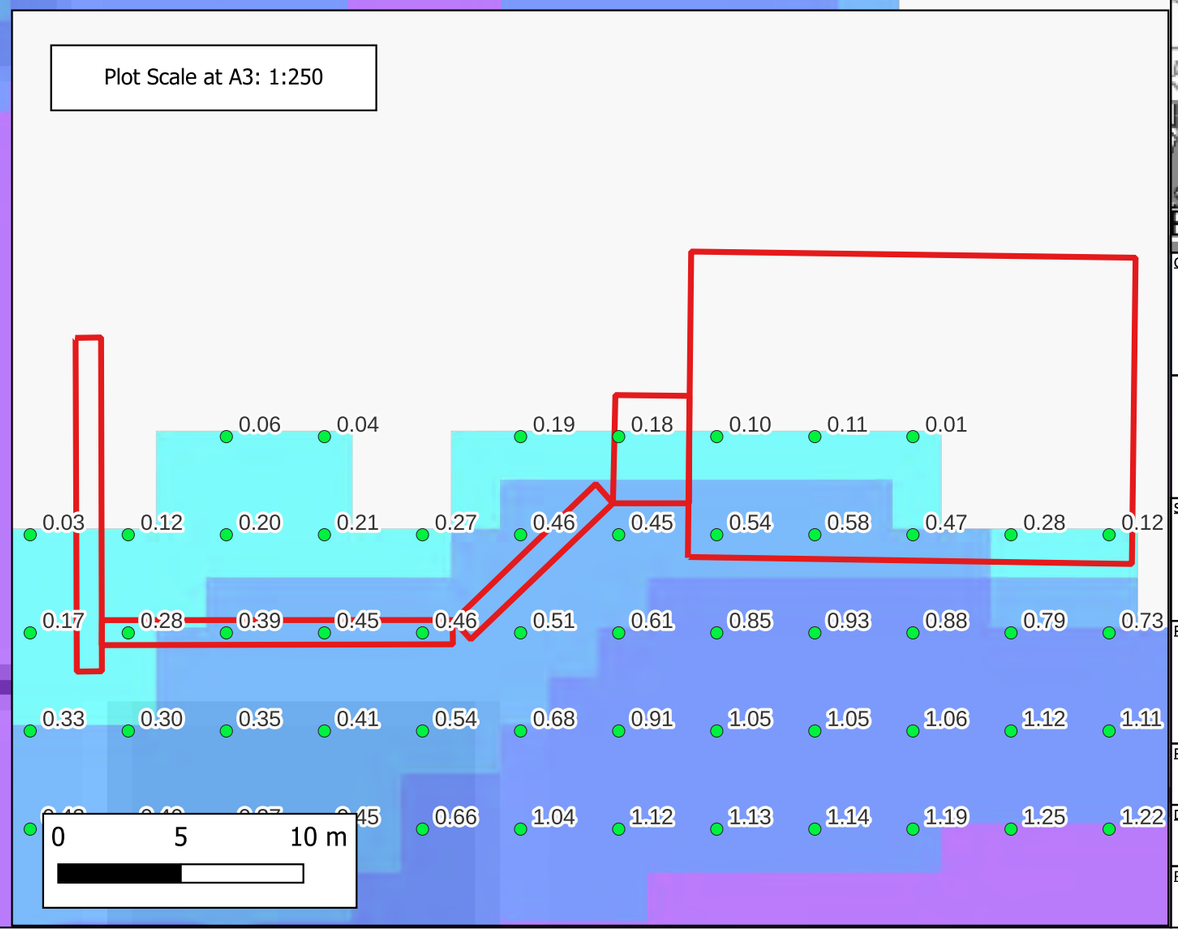
- Site Boundary

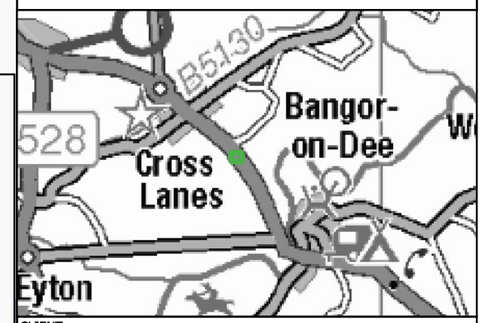
Maximum Flood Depths

- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m



Plot Scale at A3: 1:250





CLIENT:
Stuart Richards

waterco
www.waterco.co.uk

SCHEME:
Porthygan Farm, Wrexham

PLOT TITLE:
Maximum Flood Depth
1% AEP + 25% CC Fluvial Event
Existing Scenario
Defended Scenario 2020

PLOT STATUS:	DATE:
FINAL	03-03-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:400

PLOT NAME:	REVISION:
16236_BoD2020_Q100+25%CC_d_Max	-

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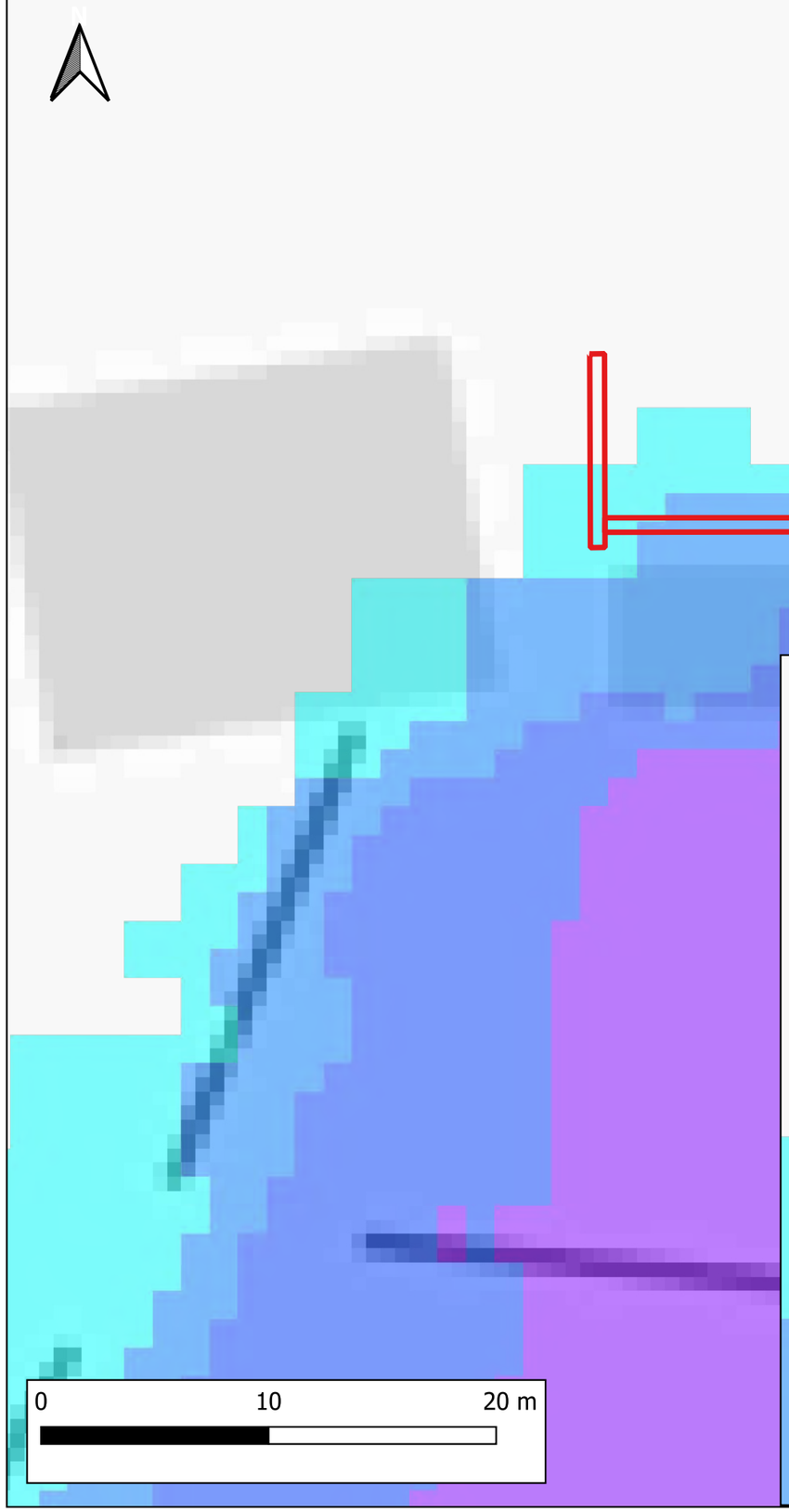
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

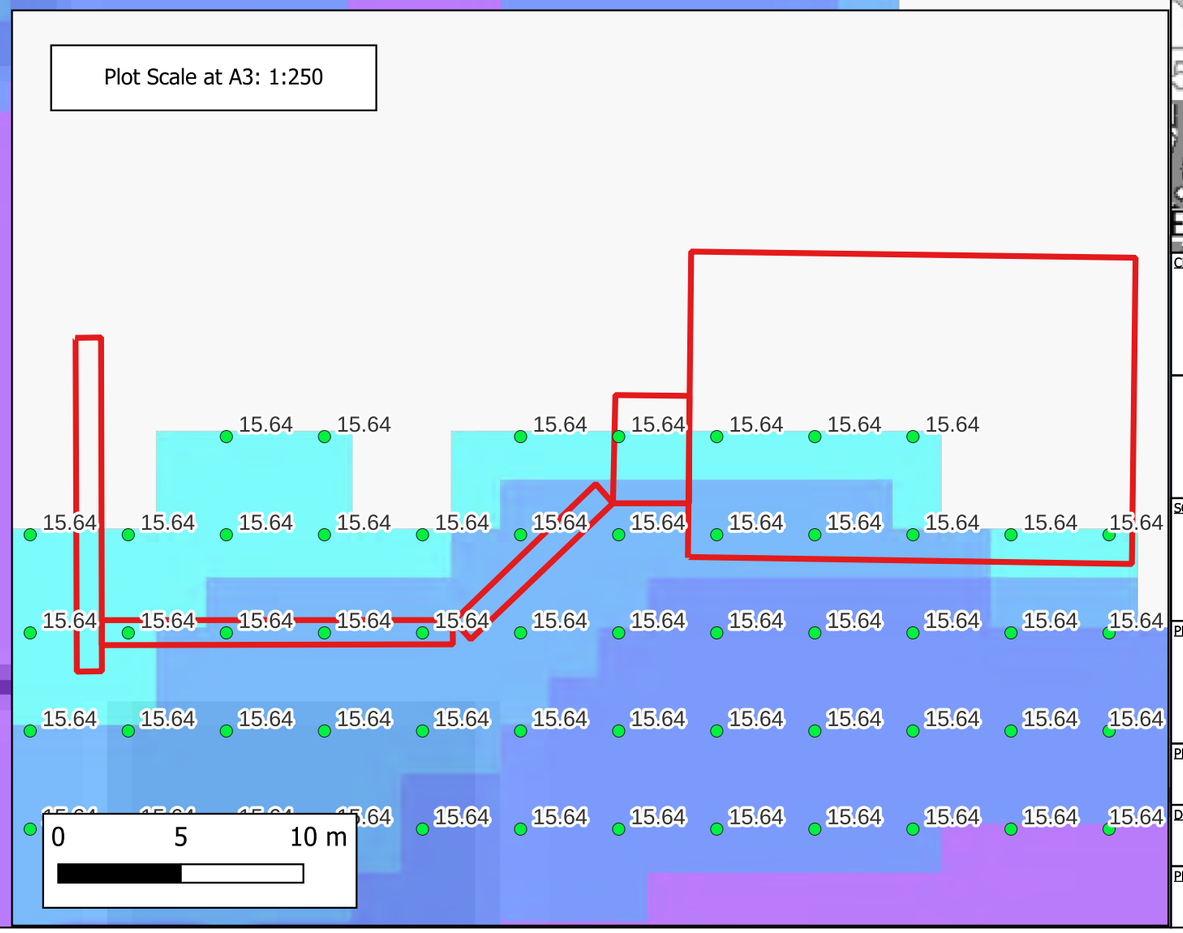
- Site Boundary

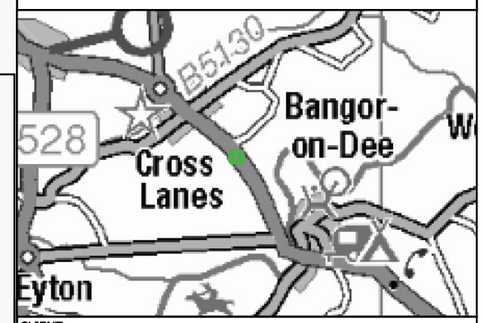
Maximum Flood Depths

- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m



Plot Scale at A3: 1:250





CLIENT:
Stuart Richards

waterco
www.waterco.co.uk

SCHEME:
Porthygan Farm, Wrexham

PLOT TITLE:
Maximum Water Level (m AOD)
1% AEP + 25% CC Fluvial Event
Existing Scenario
Defended Scenario 2020

PLOT STATUS:	DATE:
FINAL	03-03-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:400

PLOT NAME:	REVISION:
16236_BoD2020_Q100+25%CC_h	-

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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

Maximum Flood Depths

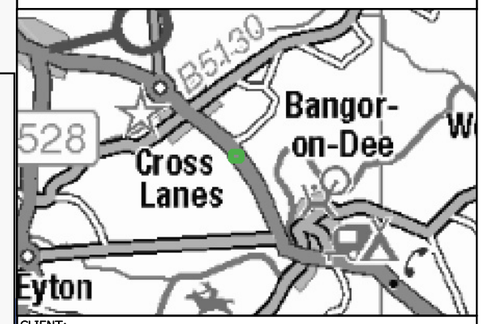
- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m

Plot Scale at A3: 1:250

0.06 0.18 0.29 0.25 0.19 0.42 0.41 0.28 0.23 0.12
0.22 0.36 0.44 0.45 0.51 0.70 0.69 0.78 0.82 0.70 0.50 0.27
0.39 0.51 0.62 0.68 0.70 0.75 0.84 1.09 1.16 1.12 1.03 0.97
0.57 0.54 0.59 0.64 0.77 0.92 1.15 1.28 1.29 1.30 1.36 1.35
0.90 1.28 1.35 1.36 1.38 1.43 1.48 1.46

0 10 20 m

0 5 10 m



CLIENT:
Stuart Richards

waterco
www.waterco.co.uk

SCHEME:
Porthygan Farm, Wrexham

PLOT TITLE:
Maximum Flood Depth
1% AEP + 50% CC Fluvial Event
Existing Scenario
Defended Scenario 2020

PLOT STATUS:	DATE:
FINAL	03-03-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:400

PLOT NAME:	REVISION:
16236_BoD2020_Q100+50%CC_d_Max	-

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Notes:
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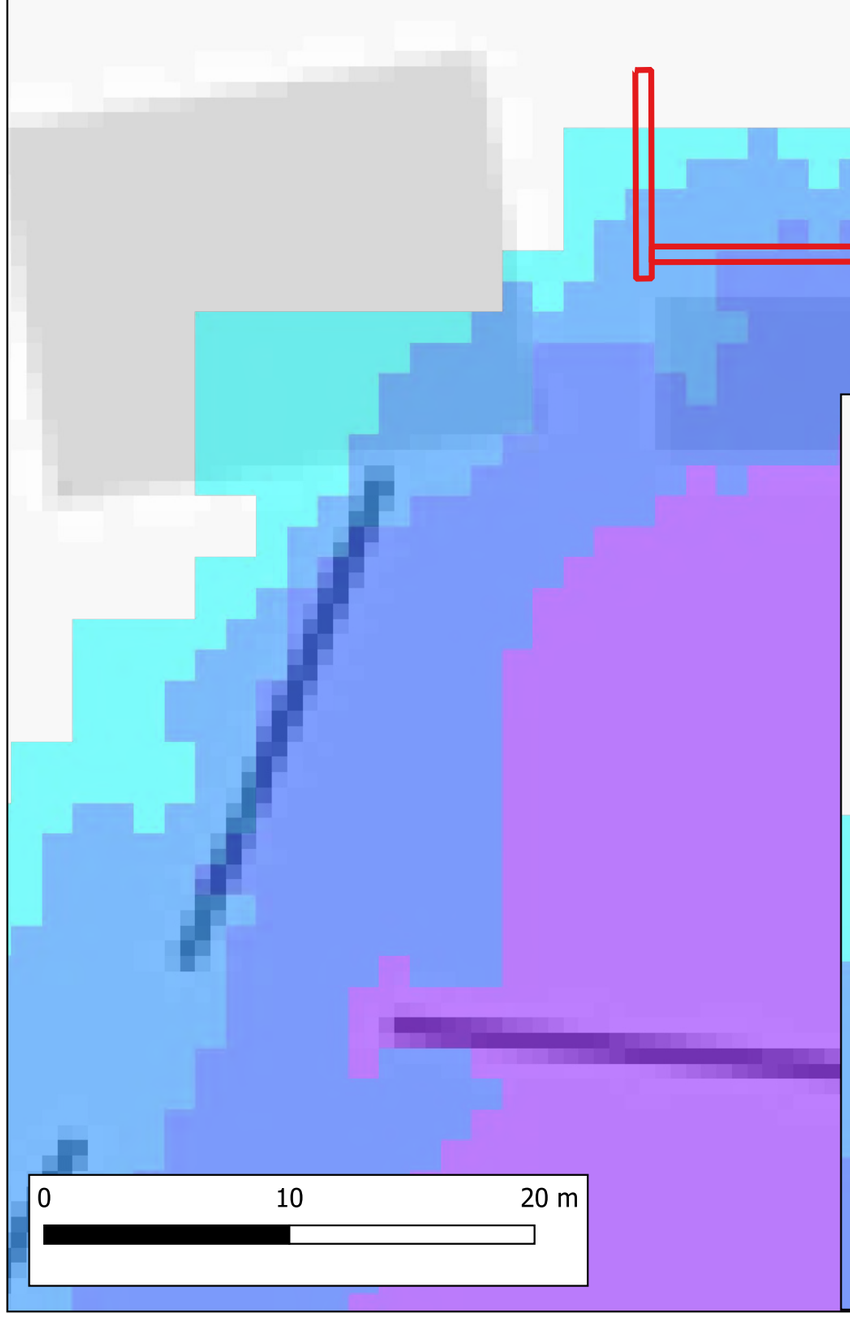
LEGEND

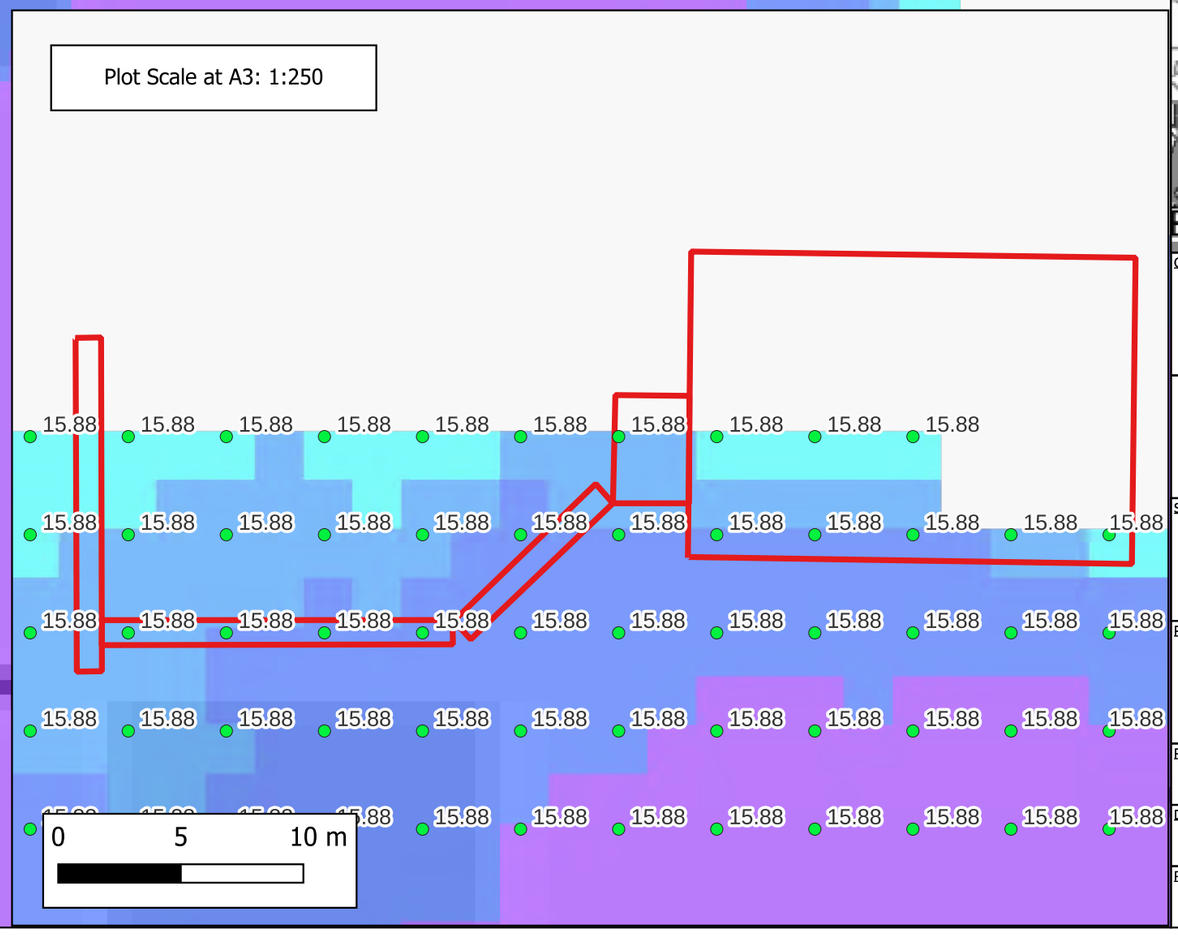
- Site Boundary

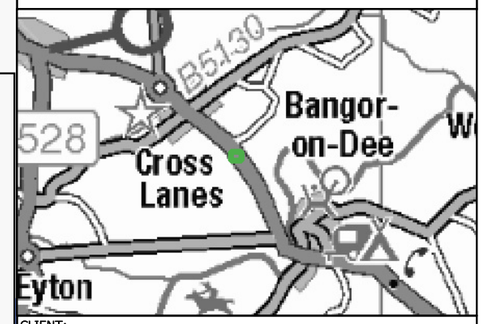
Maximum Flood Depths

- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m

Plot Scale at A3: 1:250







CLIENT:
Stuart Richards

waterco
www.waterco.co.uk

SCHEME:
Porthygan Farm, Wrexham

PLOT TITLE:
Maximum Water Level (m AOD)
1% AEP + 50% CC Fluvial Event
Existing Scenario
Defended Scenario 2020

PLOT STATUS:	DATE:
FINAL	03-03-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:400

PLOT NAME:	REVISION:
16236_BoD2020_Q100+50%CC_h	-

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Notes:
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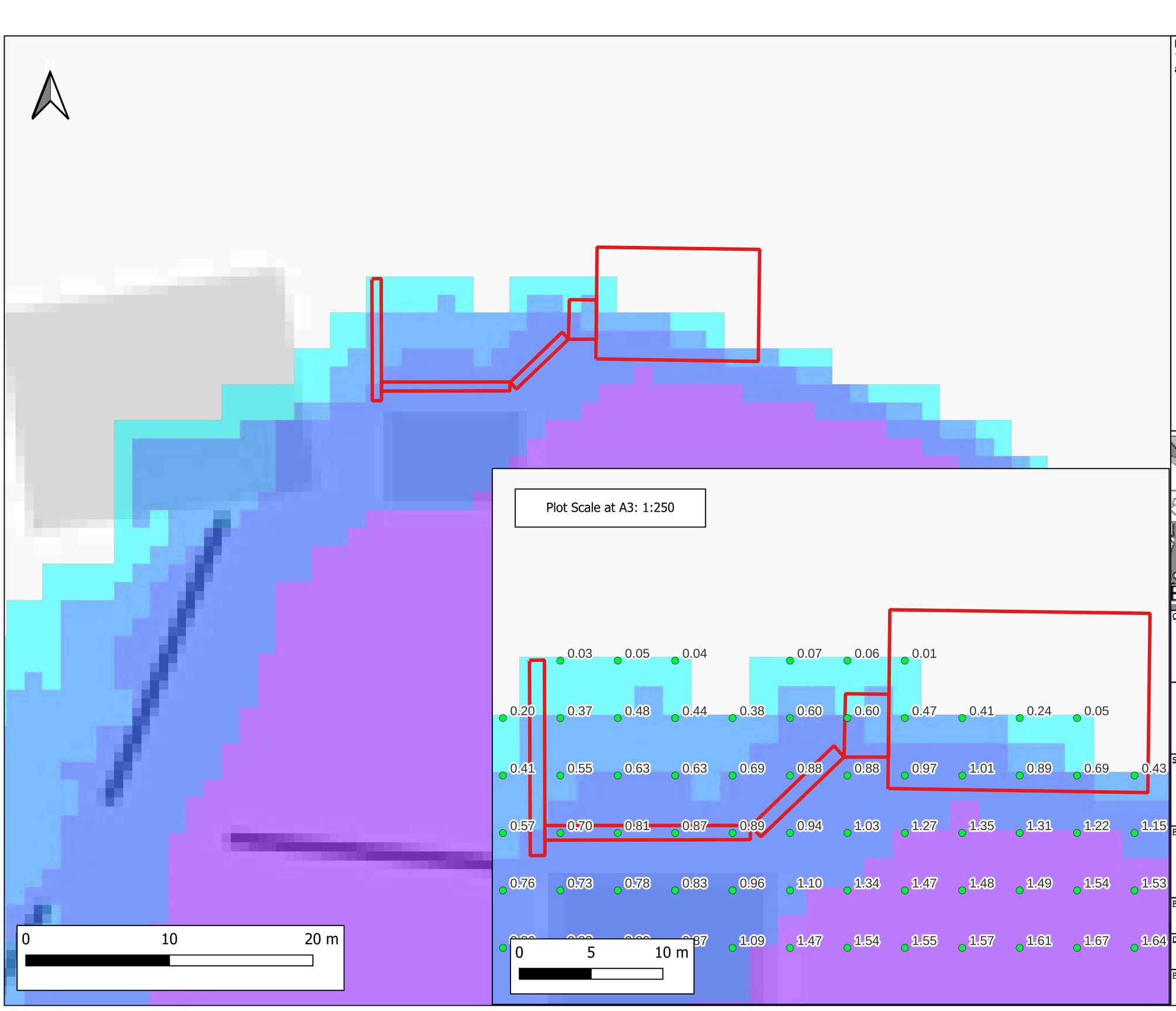
LEGEND

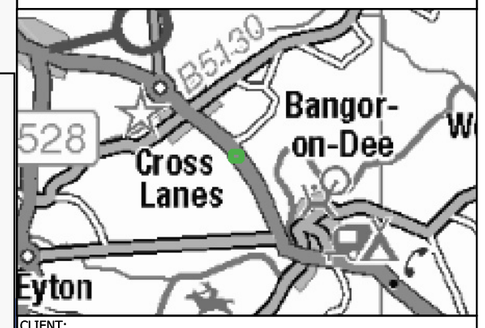
- Site Boundary

Maximum Flood Depths

- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m

Plot Scale at A3: 1:250





CLIENT:
Stuart Richards

waterco
www.waterco.co.uk

SCHEME:
Porthygan Farm, Wrexham

PLOT TITLE:
Maximum Flood Depth
0.1% AEP Fluvial Event
Existing Scenario
Defended Scenario 2020

PLOT STATUS:	DATE:
FINAL	03-03-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:400

PLOT NAME:	REVISION:
16236_BoD2020_Q1000_d_Max	-

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Notes:
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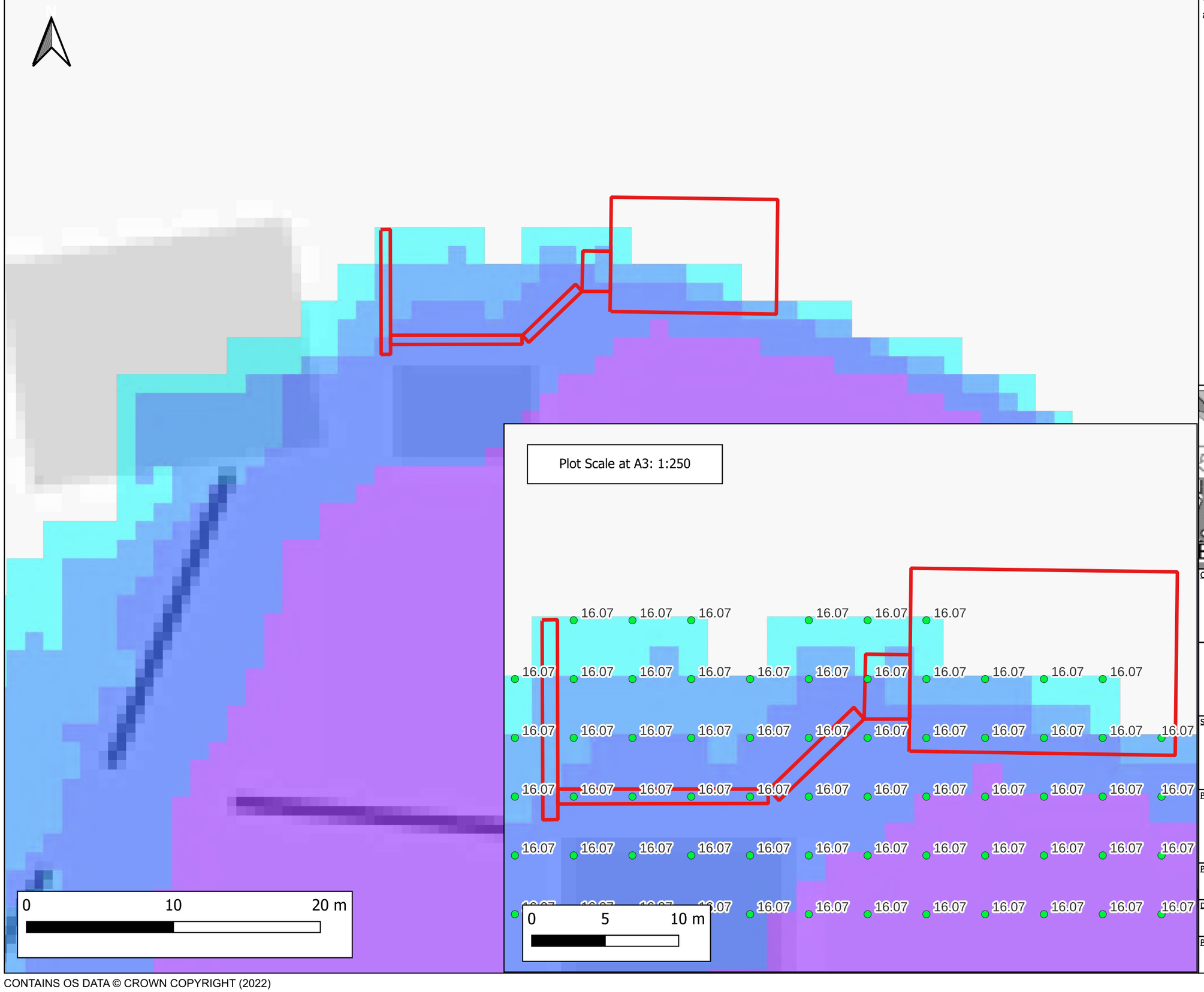
LEGEND

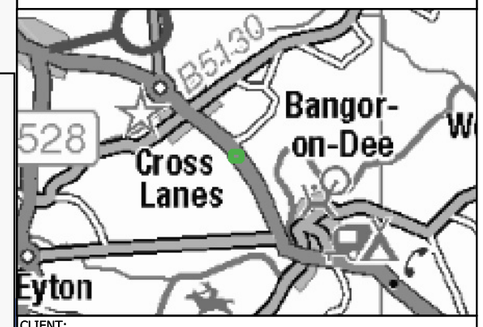
- Site Boundary

Maximum Flood Depths

- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m

Plot Scale at A3: 1:250





CLIENT:
Stuart Richards

waterco
www.waterco.co.uk

SCHEME:
Porthygan Farm, Wrexham

PLOT TITLE:
Maximum Water Level (m AOD)
0.1% AEP Fluvial Event
Existing Scenario
Defended Scenario 2020

PLOT STATUS:	DATE:
FINAL	03-03-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:400

PLOT NAME:	REVISION:
16236_BoD2020_Q1000_h	-

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Notes:
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LEGEND

- Site Boundary

Maximum Flood Depths

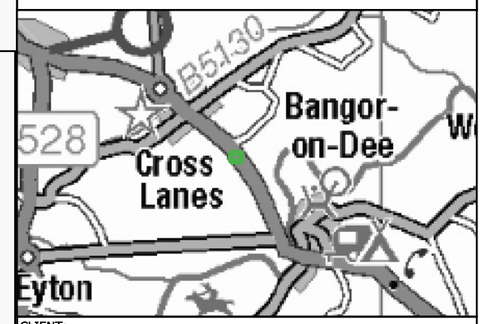
- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m

Plot Scale at A3: 1:250

0 10 20 m

0 5 10 m

0.04 0.04
0.03 0.04 0.07 0.16 0.21 0.25 0.32 0.25 0.11
0.02 0.08 0.16 0.21 0.24 0.34 0.52 0.64 0.63 0.57 0.51
0.05 0.06 0.14 0.24 0.38 0.56 0.74 0.80 0.79 0.85 0.85
0.36 0.62 0.85 0.88 0.90 0.95 0.99 0.97



CLIENT:
Stuart Richards

waterco
www.waterco.co.uk

SCHEME:
Porthygan Farm, Wrexham

PLOT TITLE:
Maximum Flood Depth
1% AEP Fluvial Event
Existing Scenario
Undefended Scenario 2012

PLOT STATUS:	DATE:
FINAL	03-03-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:400

PLOT NAME:	REVISION:
16236_BoD_UNDEF_Q100_d_Max	-

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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

Maximum Flood Depths

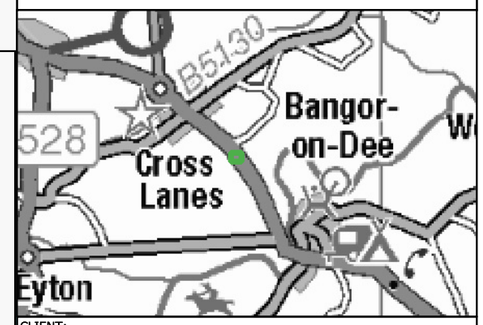
- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m

Plot Scale at A3: 1:250

0 10 20 m

0 5 10 m

0.06 0.07 0.07 0.08
0.03 0.05 0.07 0.11 0.26 0.31 0.36 0.42 0.36 0.21 0.12
0.08 0.18 0.26 0.31 0.35 0.45 0.62 0.75 0.74 0.67 0.61
0.15 0.17 0.25 0.34 0.48 0.66 0.85 0.90 0.89 0.95 0.95
0.46 0.73 0.96 0.99 1.01 1.06 1.10 1.08



CLIENT:
Stuart Richards

waterco
www.waterco.co.uk

SCHEME:
Porthygan Farm, Wrexham

PLOT TITLE:
Maximum Flood Depth
1% AEP + 20% CC Fluvial Event
Existing Scenario
Undefended Scenario 2012

PLOT STATUS:	DATE:
FINAL	03-03-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:400

PLOT NAME:	REVISION:
16236_BoD_UNDEF_Q100+20%CC_d_Max	-

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Notes:
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LEGEND

- Site Boundary

Maximum Flood Depths

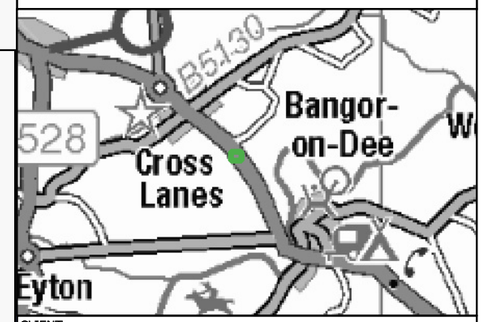
- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m

Plot Scale at A3: 1:250

0 10 20 m

0 5 10 m

0.08 0.09 0.10
0.24 0.34 0.38 0.32 0.41 0.51 0.43 0.29 0.21 0.11
0.42 0.52 0.55 0.53 0.75 0.80 0.84 0.91 0.84 0.66 0.40
0.57 0.67 0.75 0.80 0.83 0.94 1.11 1.23 1.22 1.16 1.10
0.64 0.65 0.73 0.83 0.97 1.15 1.33 1.39 1.38 1.44 1.44
0.95 1.22 1.44 1.47 1.49 1.54 1.58 1.56



CLIENT:
Stuart Richards

waterco
www.waterco.co.uk

SCHEME:
Porthygan Farm, Wrexham

PLOT TITLE:
Maximum Flood Depth
0.1% AEP Fluvial Event
Existing Scenario
Undefended Scenario 2012

PLOT STATUS:	DATE:
FINAL	03-03-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:400

PLOT NAME:	REVISION:
16236_BoD_UNDEF_Q1000_d_Max	-

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Notes:
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LEGEND

- Site Boundary

Maximum Flood Depths

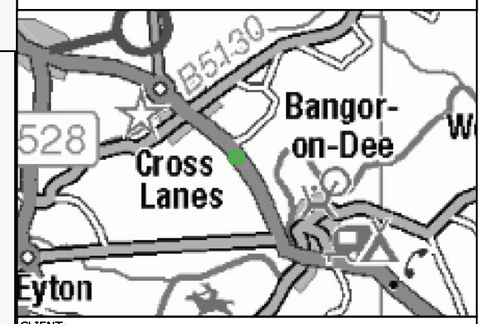
- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m

Plot Scale at A3: 1:250

0 10 20 m

0 5 10 m

0.05 0.05 0.06 0.07
0.04 0.06 0.09 0.21 0.26 0.31 0.38 0.31 0.16 0.11
0.04 0.13 0.21 0.26 0.30 0.40 0.58 0.70 0.69 0.62 0.57
0.10 0.12 0.20 0.29 0.44 0.61 0.80 0.85 0.84 0.90 0.90
0.41 0.68 0.91 0.94 0.96 1.01 1.05 1.03



CLIENT:
Stuart Richards

waterco
www.waterco.co.uk

SCHEME:
Porthygan Farm, Wrexham

PLOT TITLE:
Maximum Flood Depth
1% AEP Fluvial Event
Old Dee Bridge Breach

PLOT STATUS:	DATE:
FINAL	03-03-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:400

PLOT NAME:	REVISION:
16236_BoD_B2_Q1000_d_Max	-

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