

Brogan Solar Farm, Llanfyllin

Flood Consequences Assessment & Drainage Strategy

April 2026

Project Information	
Project:	Brogan Solar Farm, Llanfyllin
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Client:	Fuse Renewables Ltd
Instruction:	The instruction to undertake this Flood Risk Assessment & Drainage Strategy was received from Chris Binns of Pegasus Planning Group acting on behalf of the Client.
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Approval Record	
Author:	Adam McCulloch BSc (Hons)
Checker:	Jack Pugh BSc (Hons)
Approver:	Aled Williams BSc (Hons) MCIWEM C.WEM

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01	06/02/2026	First issue
02	18/03/2026	Second issue – Updated with revised layout
03	14/04/2026	Third issue – Updated with revised layout

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Introduction

Waterco has been instructed to prepare a Flood Consequences Assessment (FCA) and Drainage Strategy in relation to a proposed solar development at Brogan Solar Farm, Llanfyllin, Powys, SY22 5LQ.

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, Flooding and Coastal Erosion.

This report also comprises a Drainage Strategy. The aim of the Drainage Strategy is to identify water management measures, including Sustainable Drainage Systems (SuDS), to provide surface water runoff reduction and treatment. This report has been prepared in accordance with the Welsh Government 'Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems (2018) – herein referred to as 'the Statutory Standards for SuDS'.

Existing Conditions

The site covers an area of approximately 12.1 hectares (ha) with development split across two parcels of land, namely Parcel 1 and Parcel 2. Parcel 1 is centred at National Grid Reference (NGR): 317659, 318974. Parcel 2 is centred at NGR: 317502, 318807. A location plan and an aerial image are included in Appendix A.

Online mapping (including Google Maps / Google Streetview imagery, accessed April 2026) shows that the site comprises agricultural land. Parcel 1 is bordered by an unnamed access road and agricultural land to the north, agricultural land to the east and south, and the B4393 to the west. Parcel 2 is bordered by agricultural land to the north-east, an unnamed access road and agricultural land to the south, and the B4393 to the west. Access to all land parcels is provided from an unnamed access road off the B4393.

Local Topography

A topographical survey has been undertaken by Survey Solutions in December 2025. The topographical survey shows that Parcel 1 slopes from 103.5 metres Above Ordnance Datum (m AOD) in the south to 99.41m AOD in the north. Parcel 2 slopes from 104.57m AOD in the south-west to 100.89m AOD in the north.

Topographic levels to m AOD have also been derived from a 1m resolution Natural Resources Wales (NRW) composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). The LiDAR data generally corroborates with the topographical survey.

Topographical information is provided as Appendix B.

Ground Conditions

The British Geological Survey (BGS) online mapping (1:50,000 scale) indicates that Parcel 1 is underlain by superficial Devensian Till deposits comprising diamicton, superficial Alluvium deposits comprising clay, silt and gravel, and superficial Devensian Glaciofluvial deposits comprising sand and gravel. The majority of

Parcel 2 is underlain by superficial Devensian Till deposits comprising diamicton, with superficial Alluvium deposits comprising clay, silt, sand and gravel recorded in the northern extent.

The superficial deposits identified across the site are underlain by bedrock of the Allt-Tair-Ffynnon Formation consisting of interbedded siltstone and mudstone.

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

According to NRW's Aquifer Designation data, obtained from the BGS GeoIndex online mapping [accessed February 2026], the underlying Allt-Tair-Ffynnon Formation is classified as a Secondary B Aquifer. Secondary B aquifers are mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks (called fissures) and openings and eroded layers.

The Cranfield University 'Soilscapes' map [accessed February 2026] indicates that Parcel 1 is underlain by '*Slowly permeable seasonally wet loamy and clayey soils*'. Parcel 2 is underlain by '*Freely draining floodplain soils*'.

Local Drainage

Hafren Dyfrdwy have confirmed that there are no public sewers in the immediate vicinity of the site. There are no records of a formal drainage system serving the site.

Development Proposals

The proposed development is for a 5MW solar farm development comprising of in-field ground mounted solar arrays with associated access tracks and inverter platforms. A proposed development plan is included in Appendix C.

The majority of the site will remain permeable, with land beneath the solar panels retained as grassland. Access tracks will be formed from permeable material (compacted stone).

Flood Zone Category and Policy Context

Flood Zone Category

The NRW 'Flood Map for Planning' (Appendix D), shows that Parcel 2 is located within an area outside of the extreme flood extent (Flood Zone 1), meaning it has a less than 0.1% annual probability of flooding, including the effects of climate change. The majority of Parcel 1 is located within Flood Zone 1. The northern extent of Parcel 1 is located within Flood Zone 2 and Flood Zone 3. Flood Zone 2 is defined as having between a 1% (1 in 100) and 0.1% annual probability of fluvial flooding, including the effects of climate change. Flood Zone 3 is defined as having a 1% (1 in 100) or greater annual probability of fluvial flooding, including the effects of climate change.

Development Vulnerability Classification

The proposed solar development is considered to be 'less vulnerable' development in accordance with Figure 4 of the Welsh Government's Technical Advice Note 15 (TAN15) – Development, Flooding and Coastal Erosion.

Section 10.12 of TAN15 states that in Flood Zone 1, applications for all types of development are acceptable in principle.

Section 10.23 of TAN15 states that 'Other proposals [applicable to less vulnerable development] will only be appropriate if they are essential to the Development Plan Strategy to regenerate an existing settlement or achieve key economic or environmental objectives.

Local Policy

The Powys Local Development Plan (2011-2026) contains the following policies relating to flood risk and drainage:

'Policy DM5 – Development and Flood Risk:

Development proposals must be located away from tidal or fluvial flood plains unless it can be demonstrated that the site is justified in line with national guidance and an appropriate detailed technical assessment has been undertaken to ensure that the development is designed to reduce / avoid the threat and alleviate the consequences of flooding over its lifetime. In addition the development must not increase flood risk elsewhere, and shall where possible allow floodplains to provide water storage to reduce flooding in the catchment, unless:

- 1. The development is of a very minor nature such as an extension to a dwelling; or*
- 2. There is an overriding need in the public interest for the development.*

Policy DM6 – Flood Prevention Measures and Land Drainage

Development proposals must avoid unnecessary flood risk by assessing the implications of development within areas susceptible to all types of flooding; any development that unacceptably increases risk will be refused.

Proposals near a watercourse or within an area of floodplain must comply with the following:

- 1. In areas identified at risk of flooding (fluvial, tidal, surface water and groundwater) or where a watercourse has insufficient channel capacity, opportunities to improve existing flood risk by using Sustainable Drainage Systems (SuDS), wetlands or other agreed and appropriate measures are investigated and implemented wherever possible.*
- 2. Where possible, opportunities are taken on previously developed land to make space for water by reinstating the functional floodplain.*

3. *Opportunities to make space for water by undertaking restoration and enhancement as part of the development, are identified and implemented.*
4. *Actions are taken to de-culvert wherever possible. Where this is not possible, an assessment of the structural integrity of the culvert, with any required remedial work, should be carried out prior to the development. A maintenance schedule should be developed for all culverts to ensure regular clearance, and*
5. *Any developments located adjacent to a watercourse should leave an appropriate undeveloped buffer strip, maintaining the watercourse and the immediate riparian zone as an enhancement feature and allowing for routine maintenance. The width of any buffer strip should be agreed with the relevant authorities on a site by site basis. Such sites should have a maintenance strategy for clearing and maintaining the channel, with particular regard to structures such as trash screens and bridges.*

Satisfactory provision shall be made for land drainage in all developments and this should include consideration of the use of Sustainable Drainage Systems (SuDS).'

Local guidance documents including the Mid Wales Strategic Flood Consequences Assessment (SFCA) (November 2022), the Severn Preliminary Flood Risk Assessment (PFRA) and the Powys County Council PFRA (2011 and its 2017 addendum) have been reviewed and inform this report.

Sources of Flooding and Probability

Fluvial

Parcel 1

The nearest watercourse is the River Cain which is located approximately 70m north-west of Parcel 1 at its nearest point. The River Cain flows north-east in this location to its confluence with the River Vyrnwy approximately 4.9km north-east of the site.

The northern extent of Parcel 1 is located within Flood Zone 2 and Flood Zone 3 on the NRW 'Flood Map for Planning (Rivers and Sea)'. A small area of proposed solar arrays is located within Flood Zone 2 and Flood Zone 3. A flood map with development overlay is included in Appendix E.

No modelled output data is available for the Afon Cain. Therefore, the NRW Flood Map for Planning has been used to inform the flood risk to the site. The NRW 'Flood Map for Planning' has been overlaid onto LiDAR data. The flood map with LiDAR overlay is included as Appendix E and shows that the Flood Zone 2 extent reaches a maximum elevation of 99.65m AOD on site. A flood level of 99.65m AOD can therefore conservatively be derived for the 0.1% annual probability plus climate change (CC) event. The Flood Zone 3 extent reaches a maximum elevation of 99.49m AOD on site. A flood level of 99.49m AOD can therefore conservatively be derived for the 1% annual probability plus CC event.

A review of topographic levels shows that flood depths in the location of the proposed solar arrays (which

fall within the Flood Zone 2 and 3 extents) are estimated to vary from 30mm to 210mm during the 0.1% annual probability plus CC event. The maximum estimated flood depth in the location of the proposed solar arrays is 120mm during the 1% annual probability plus CC event.

The NRW 'Recorded Flood Extents' map (Appendix D) indicates that Parcel 1 is not located within a historical flood extent.

It can be concluded that the majority of Parcel 1 is at very low risk of fluvial flooding. Minimal flooding is estimated in the location of the proposed solar arrays in the northern extent of the site, with flood depths of up to 210mm during the 0.1% annual probability plus CC event.

Parcel 2

The nearest watercourse is the River Cain which is located approximately 130m north-west of Parcel 2 at its nearest point.

The NRW 'Recorded Flood Extents' map (Appendix D) indicates that Parcel 2 is not located within a historical flood extent.

Parcel 2 is located within Flood Zone 1 on the NRW 'Flood Map for Planning (Rivers and Sea)' and has a less than 0.1% annual probability of flooding. The risk of fluvial flooding is therefore considered to be very low.

Tidal

The site is situated at a minimum of 99.4m 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.

Parcel 1

The NRW 'Flood Zones - Surface Water & Small Watercourses' map (Appendix D) shows that the majority of Parcel 1 is located within Flood Zone 1, meaning it has a less than 0.1% annual probability of flooding, including the effects of climate change. The northern extent of Parcel 1 is located within Flood Zone 2 and Flood Zone 3. Flood Zone 2 is defined as having between a 1% and 0.1% annual probability of flooding, including the effects of climate change. Flood Zone 3 is defined as having a greater than 1% annual probability of flooding, including the effects of climate change.

The surface water flooding identified on the NRW mapping in the northern extent of Parcel 1 is associated with surface water ponding within a localised topographical low point. There are no distinct flow routes in the area which would direct any potential surface water flooding towards the site.

The NRW surface water and small watercourses flood mapping has been overlaid onto the proposed development plan. The NRW surface water flood map overlay is provided as Appendix F, together with NRW surface water and small watercourses flood depth mapping. As shown in Figure 1, during the present-day low risk (0.1% annual probability) event, the majority of the site is flood free. A maximum flood depth of 340mm is estimated in the northern extent of the site in the location of the proposed solar arrays.



Figure 1 – NRW Surface Water Flood Depths – Present Day Scenario

As shown in Figure 2, during the 0.1% annual probability plus CC event, the majority of the site is flood free. A maximum flood depth of 350mm is estimated in the northern extent of the site in the location of the proposed solar arrays.

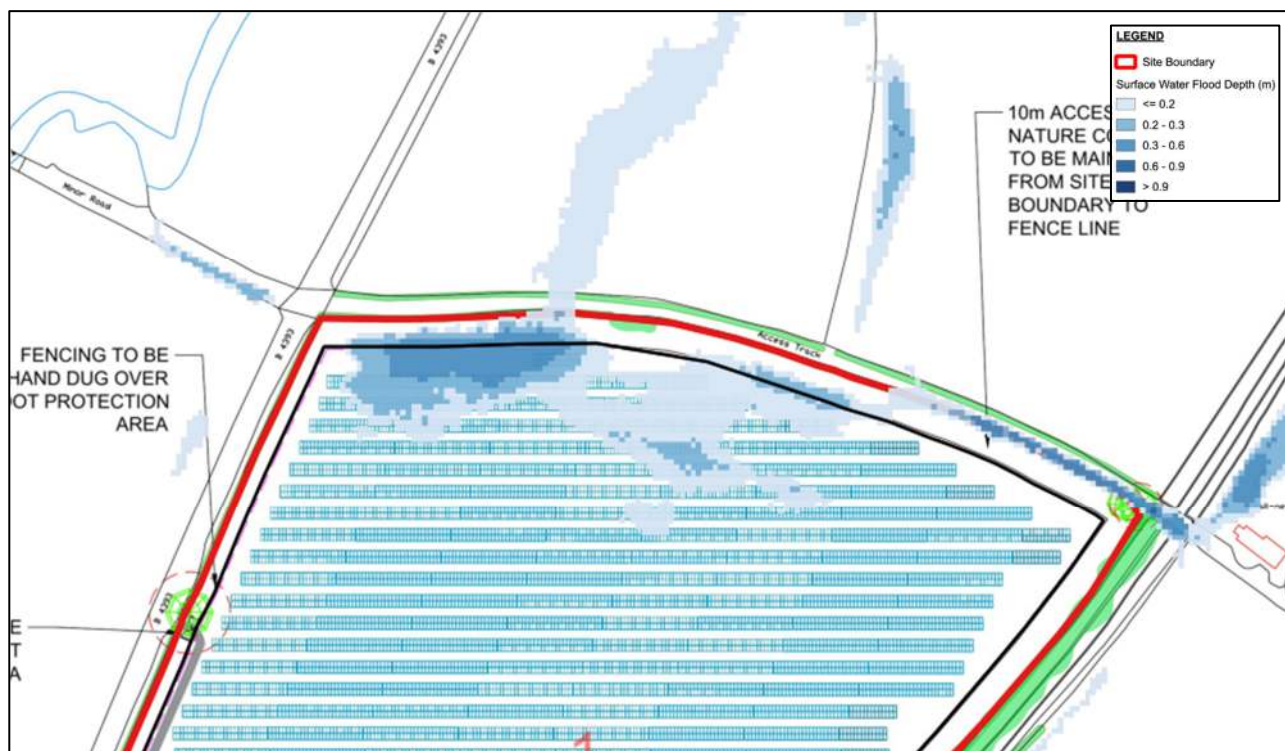


Figure 2 – NRW Surface Water Flood Depths – Climate Change Scenario

It can be concluded that the majority of Parcel 1 is at very low risk of surface water flooding. The northern extent of Parcel 1 (associated with the solar arrays) is estimated to flood with a maximum flood depth of 350mm during the 0.1% annual probability plus CC event.

Parcel 2

The NRW 'Flood Zones – Surface Water & Small Watercourses' map shows that Parcel 2 is located within Flood Zone 1.

There are no distinct flow routes in the area which would direct any potential surface water flooding towards Parcel 2.

There are no records of surface water flooding at or near to Parcel 2. It can therefore be concluded that the risk of surface water flooding to Parcel 2 is very low.

Sewer

There are no public sewers in the immediate vicinity of the site. There is therefore no risk of flooding from public sewers.

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 majority of the site is underlain by Devensian Till comprising diamicton or Alluvium

comprising clay, silt and gravel. The impermeable nature of the underlying superficial deposits will limit the vertical migration of groundwater.

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 online NRW 'Flood Risk from Reservoirs' map shows that the site is not at risk of flooding from reservoirs. It can therefore be concluded that the risk of flooding from artificial sources is very low.

Summary of Potential Flooding

It can be concluded that the majority of the site is at very low risk of flooding from all sources. The northern extent of Parcel 1 is located within Flood Zone 2 and Flood Zone 3 for fluvial and surface water flooding. A maximum fluvial flood depth of 350mm is estimated in the location of proposed solar arrays during the 0.1% annual probability plus CC event.

Mitigation

No inverters or equipment susceptible to flood damage will be located within the fluvial or surface water flood extents. The solar panels will be raised on steel supporting structures with the lowest point of the panel 600mm above surrounding ground levels. This will ensure the panel surfaces are flood free and will ensure that the development remains operational during the 1% and 0.1% annual probability plus climate change fluvial and surface water flood events.

Flood Warnings and Evacuation

Flood Alerts cover this area. Site staff (management and maintenance staff) should register to receive Flood Alerts. Flood Alerts is a free service that provides prior warning of a fluvial flood event.

The site will not be permanently staffed. Occasional staff visits will be undertaken for routine maintenance work. When a Flood Alert is in place, maintenance visits would not be undertaken.

A flood free access / egress route is available from the site access off the B4393 to the west. When leaving the site in the event of a flood, site users should head south of the B4393 which is shown in Flood Zone 1.

Impact on Flood Risk Elsewhere

As the proposed solar arrays will be elevated above the ground, flood flows will be allowed to move freely beneath the panels. The extent of development which will be located within Flood Zones 2 and 3 will be

limited to steel support structures which will have a negligible impact on flooding elsewhere.

Therefore, the development does not remove flood storage from the floodplain and will not result in an increase in flood risk elsewhere.

Surface Water Management

The site currently comprises agricultural land which is not formally drained and is therefore considered to be 100% permeable.

The proposed solar arrays will not create any significant change to the current surface water drainage regime and the majority of the Site will remain permeable. As vegetation becomes established under the PV Arrays there is likely to be a decrease in surface water runoff rates compared to the baseline scenario, as the proposed grassland provides better infiltration and water retention compared to the existing agricultural land use.

Surface Water Management from Solar Panels

The proposed ground-mounted solar arrays will be laid on steel frames ensuring the ground beneath each panel remains permeable. The rows of panels will be spaced with a 'rainwater gap' between each row of panels. Furthermore, a small gap (approximately 20mm) will be provided between each individual solar module which will allow rainfall to drain onto the ground below. Rainfall runoff from the solar arrays will therefore infiltrate to the land beneath and between the panels. It is therefore considered that the solar arrays will not result in an increase in the surface water runoff rates and volumes and betterment will be provided by the conversion of agricultural land to permanent grassland.

It is therefore considered that the solar arrays will not result in an increase in the surface water runoff rates and volumes and will not alter the existing greenfield drainage regime. This in accordance with paragraph 2.10.84 of NPS for Renewable Energy (EN-3).

Whilst the solar arrays will not result in an increase in surface water runoff rates and volumes, runoff from the panels will be concentrated towards the base of each panel which could result in soil compaction at the panel base and potential erosion (rivulets) forming.

Erosion Control Measures

To minimise overland flows and associated erosion risk, erosion control features such as filter drains will be placed at regular intervals along the contours.

A filter drain is a gravel or stone filled trench which would intercept overland flows and provide erosion control. Filter drains will be approximately 500mm wide x 300mm deep.

It is noted that the filter drains would serve an erosion control purpose and are not intended to provide storm water storage. To further ensure erosion control, a planting regime comprising grassland is also proposed. Substantial grass covering throughout the year will be maintained, with a maintenance plan put in place to

include semi-frequent inspections of grassed areas. Re-seeding will take place where appropriate to maintain grass cover.

A sketch showing the erosion control measures is provided in Appendix G.

Access Roads

All access tracks will be formed from permeable stone surfacing and will have infrequent use (minimising compaction). Rainfall on the access roads will infiltrate through the permeable surface.

Inverter Compound Areas

The proposed inverter platforms will cover a minimal footprint and runoff from the inverters will drain to surrounding land. Runoff from the inverter compound areas will be directed to the proposed filter drains where possible.

Surface Water Treatment

The Statutory Standards for SuDS sets out the following guidance for surface water treatment:

S3 - Surface water quality management

Treatment for surface water runoff should be provided to prevent negative impacts on the receiving water quality and/or protect downstream drainage systems, including sewers.

In accordance with the CIRIA C753 publication 'The SuDS Manual' (2015), low traffic roads (applicable to the access roads) are classified as having a 'low' pollution hazard level. Table 1 shows the pollution hazard indices for the access roads.

Table 1 – Pollution Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Low Traffic Roads	Low	0.5	0.4	0.4

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 26.2

* Indices values range from 0-1.

The access roads will be formed from permeable stone surfacing. Table 2 below demonstrates that permeable surfacing provides sufficient treatment.

Table 2 – SuDS Mitigation Indices

Type of SuDS	Mitigation Indices		
	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Permeable Surfacing	0.7	0.6	0.7

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 26.3

Construction, Operation and Maintenance

All drainage systems will be readily accessible for maintenance access.

Maintenance of drainage / erosion control features such as filter drains and permeable surfacing will be the responsibility of the site management. Maintenance schedules for filter drains and permeable surfacing are included in Appendix H.

Conclusions

The proposed development is for a solar farm comprising in-field ground mounted solar arrays with associated access tracks and inverter platforms.

Flood Risk

The NRW 'Flood Map for Planning' shows that the majority of the site is outside of the extreme flood extent (Flood Zone 1), meaning it has a less than 0.1% annual probability of flooding from rivers and the sea, including the effects of climate change. The northernmost extent of the site is located within Flood Zone 2 and Flood Zone 3. Flood Zone 2 is defined as having between a 1% (1 in 100) and 0.1% annual probability of fluvial flooding, including the effects of climate change. Flood Zone 3 is defined as having a 1% (1 in 100) or greater annual probability of fluvial flooding, including the effects of climate change.

The northernmost extent of the site is also located within the surface water Flood Zone 2 and Flood Zone 3 extents.

Flood depths in the location of the proposed solar arrays (which fall within the Flood Zone 2 and 3 extents) are estimated to vary from 30mm to 210mm during the 0.1% annual probability plus CC event. The maximum estimated flood depth in the location of the proposed solar arrays is 120mm during the 1% annual probability plus CC event. The solar arrays will be raised on steel supporting structures 600mm above surrounding ground levels. This will ensure the panel surfaces are flood free and will ensure that the development remains operational during the 1% and 0.1% annual probability plus climate change fluvial and surface water flood events.

A safe access / egress is available from the B4393 west of the site during all flood events.

Drainage

The proposed ground-mounted solar arrays will be laid on steel supports ensuring the ground beneath each panel remains permeable. The rows of panels will be spaced with a 'rainwater gap' between each row of panels. Furthermore, a small gap (approximately 20mm) will be provided between each individual solar module. Rainfall runoff from the solar arrays will infiltrate to the land beneath and between the panels. It is therefore considered that the solar arrays will not result in an increase in the surface water runoff rates and volumes, and betterment will be provided by the conversion of agricultural land to permanent grassland.

Whilst the solar arrays will not result in an increase in surface water runoff rates and volumes, runoff from the panels will be concentrated at the base of each panel which could result in soil compaction at the panel base and potential erosion (rivulets) forming.

To minimise overland flows and associated erosion risk, and to provide betterment over the existing scenario, erosion control features such as filter drains will be placed at regular intervals along the contours. It is noted that the filter drains would serve an erosion control purpose and are not intended to provide storm water storage. To further ensure erosion control, a planting regime comprising grassland is also proposed. Substantial grass covering throughout the year will be maintained, with a maintenance plan put in place to include semi-frequent inspections of grassed areas. Re-seeding will take place where appropriate to maintain

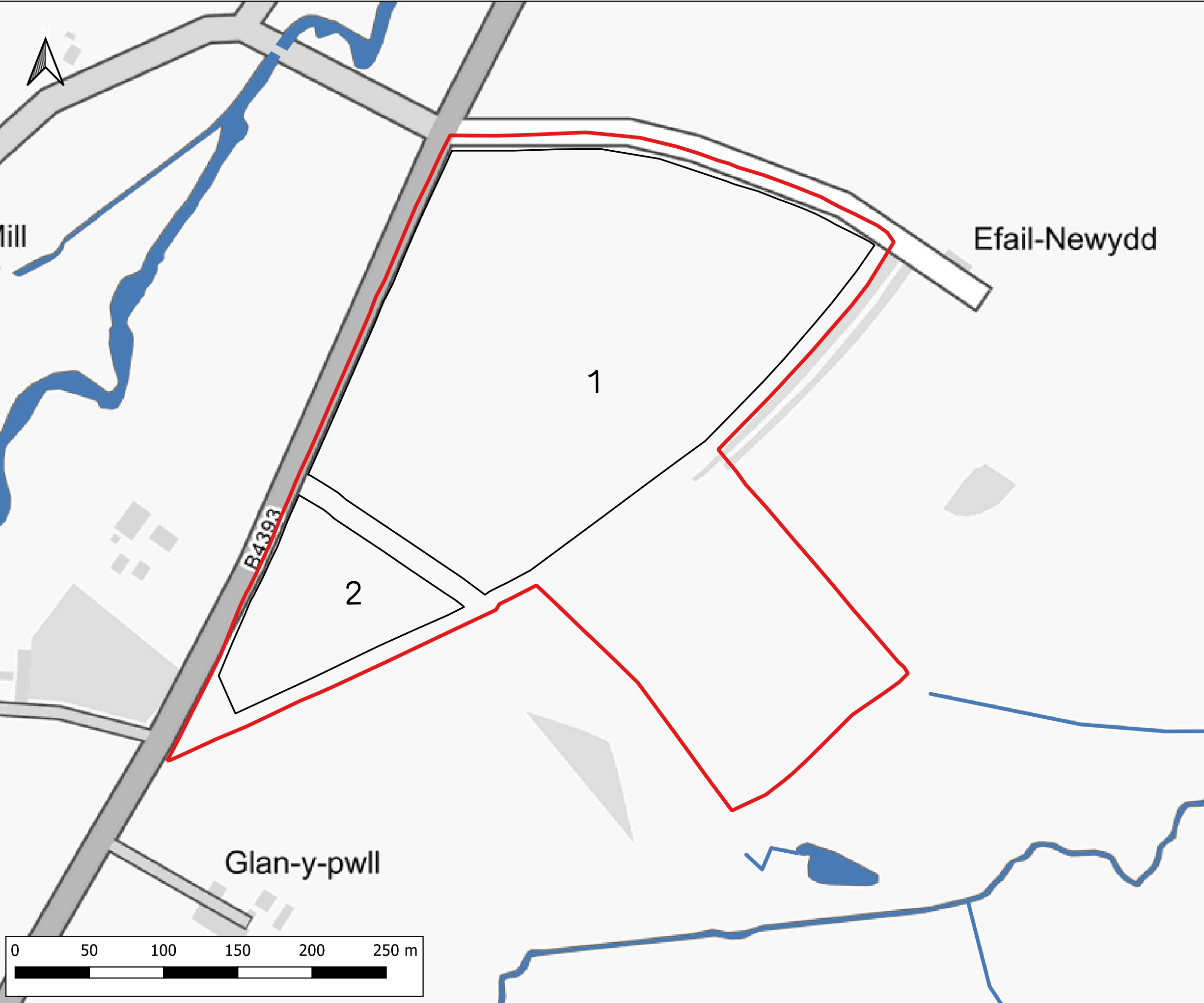
grass cover.

All access tracks will be formed from permeable stone surfacing and will have infrequent use (minimising compaction). Rainfall on the access roads will infiltrate through the permeable surface.

The proposed inverter platforms will cover a minimal footprint and runoff from the inverters will drain to surrounding land. Runoff from the inverter compound areas will be directed to the proposed filter drains where possible.

A Concept Designer's Risk Assessment (cDRA) has been prepared to inform future designers of any identified hazards associated with the scheme. The cDRA has been included in Appendix I.

Appendix A Location Plan & Aerial Image



CONTAINS OS DATA © CROWN COPYRIGHT (2026)

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

LEGEND

- Site Boundary
- Watercourses
- Waterbodies
- Land Parcel Split

CLIENT:

Fuse Renewables Ltd

www.waterco.co.uk

SCHEME:

Brogan Solar Farm, LLanfyllin

PLOT TITLE:

Location Plan

PLOT STATUS:			DATE:
FINAL			10-04-2026

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
ER	AW	NJ	1:2500

PLOT NAME:	REVISION:
17112_Location_Plan	-



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

LEGEND

Site Boundary

Land Parcel Split

CLIENT:

Fuse Renewables Ltd

www.waterco.co.uk

SCHEME:

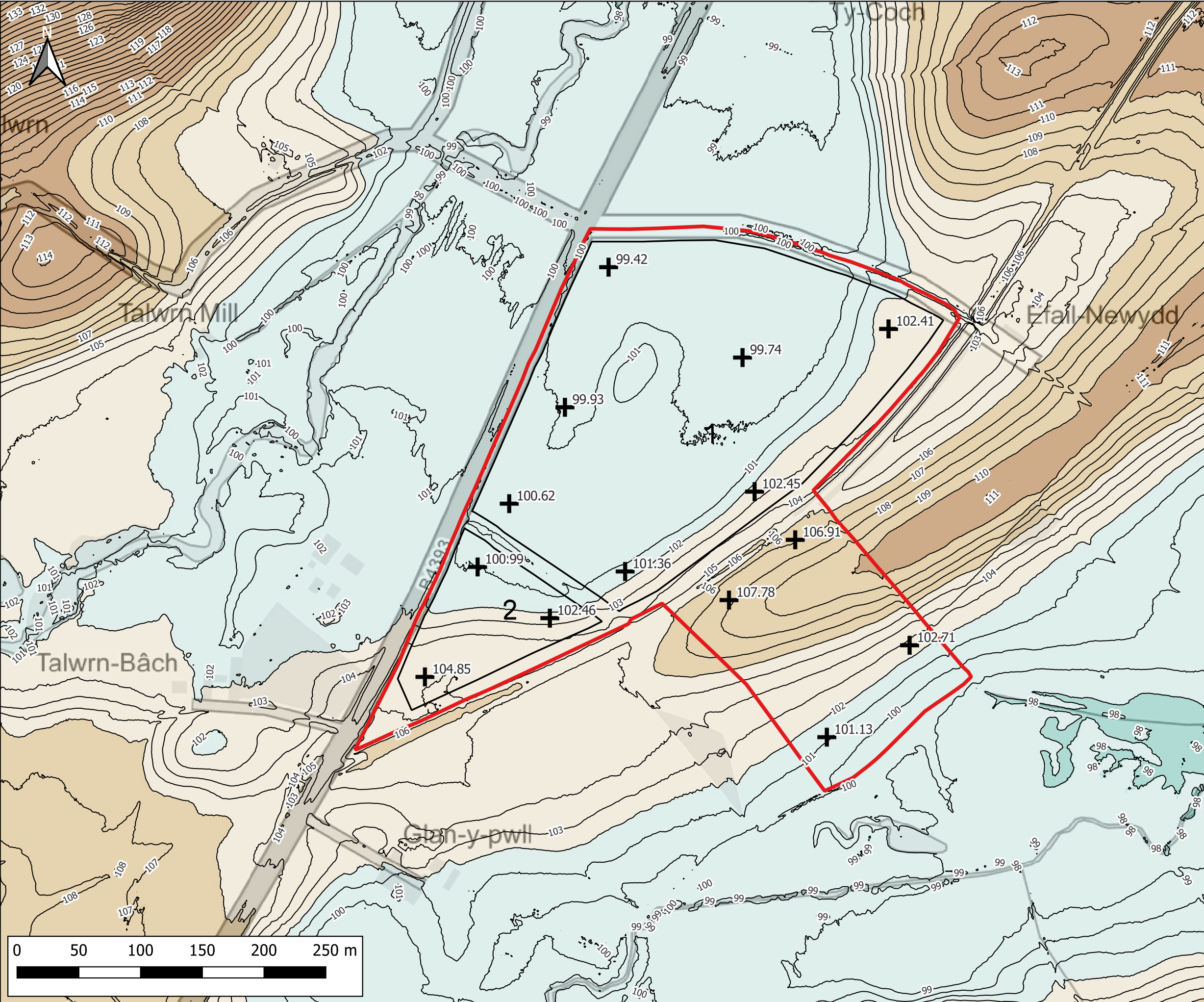
Brogan Solar Farm, LLanfyllin

PLOT TITLE:

Aerial Plan

PLOT STATUS:		FINAL		DATE:	10-04-2026
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:		
ER	AW	NJ	1:2500		
PLOT NAME:				REVISION:	
17112_Aerial_Plan				-	

Appendix B Topographical Information



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

LEGEND

- Site Boundary
- Land Parcel Split
- Site Levels (m AOD)

Ground Elevation (m AOD)

- <= 98
- 98 - 102
- 102 - 106
- 106 - 110
- > 110

CLIENT:
Fuse Renewables Ltd

waterco
www.waterco.co.uk

SCHEME:
Brogan Solar Farm, Llanfyllin

PLOT TITLE:
LiDAR Plan
1m Resolution
Data from Natural Resources Wales (December 2025)

PLOT STATUS:
FINAL

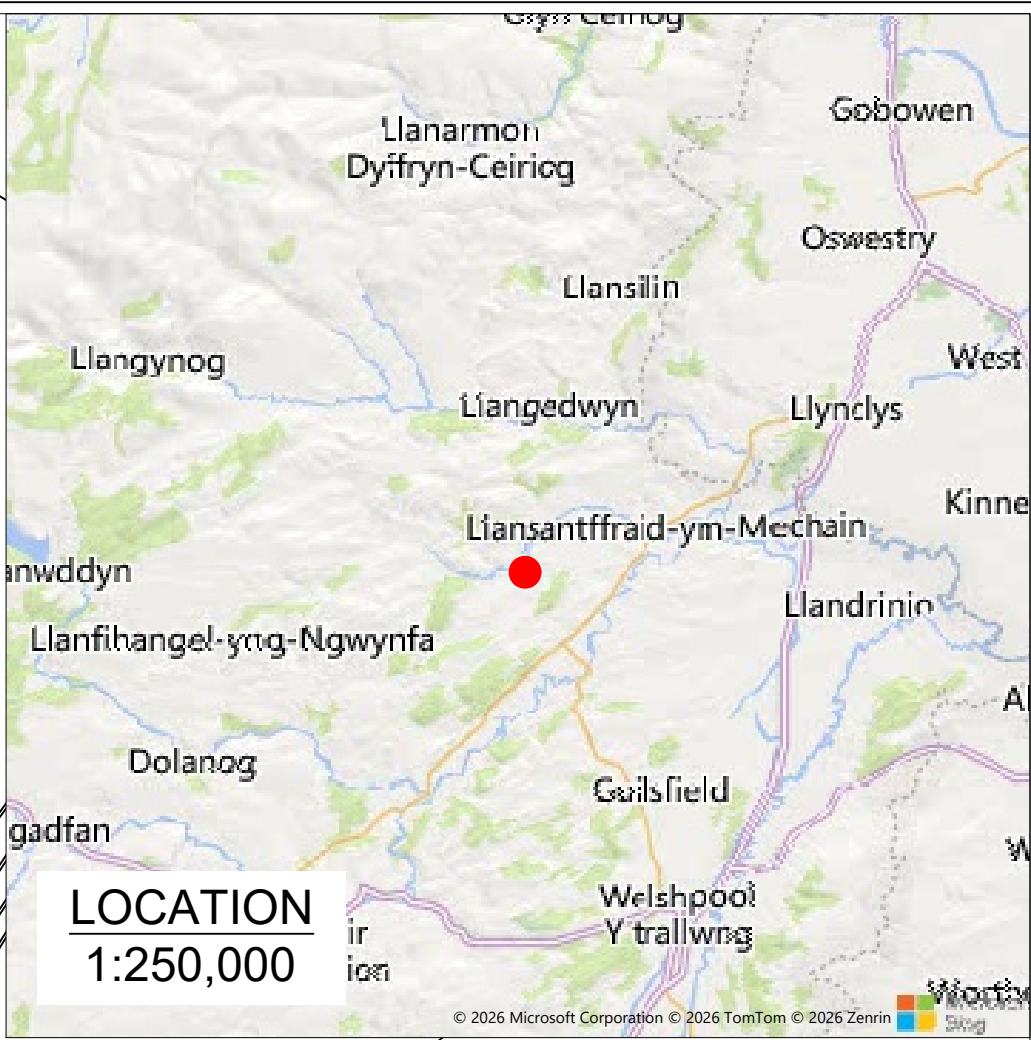
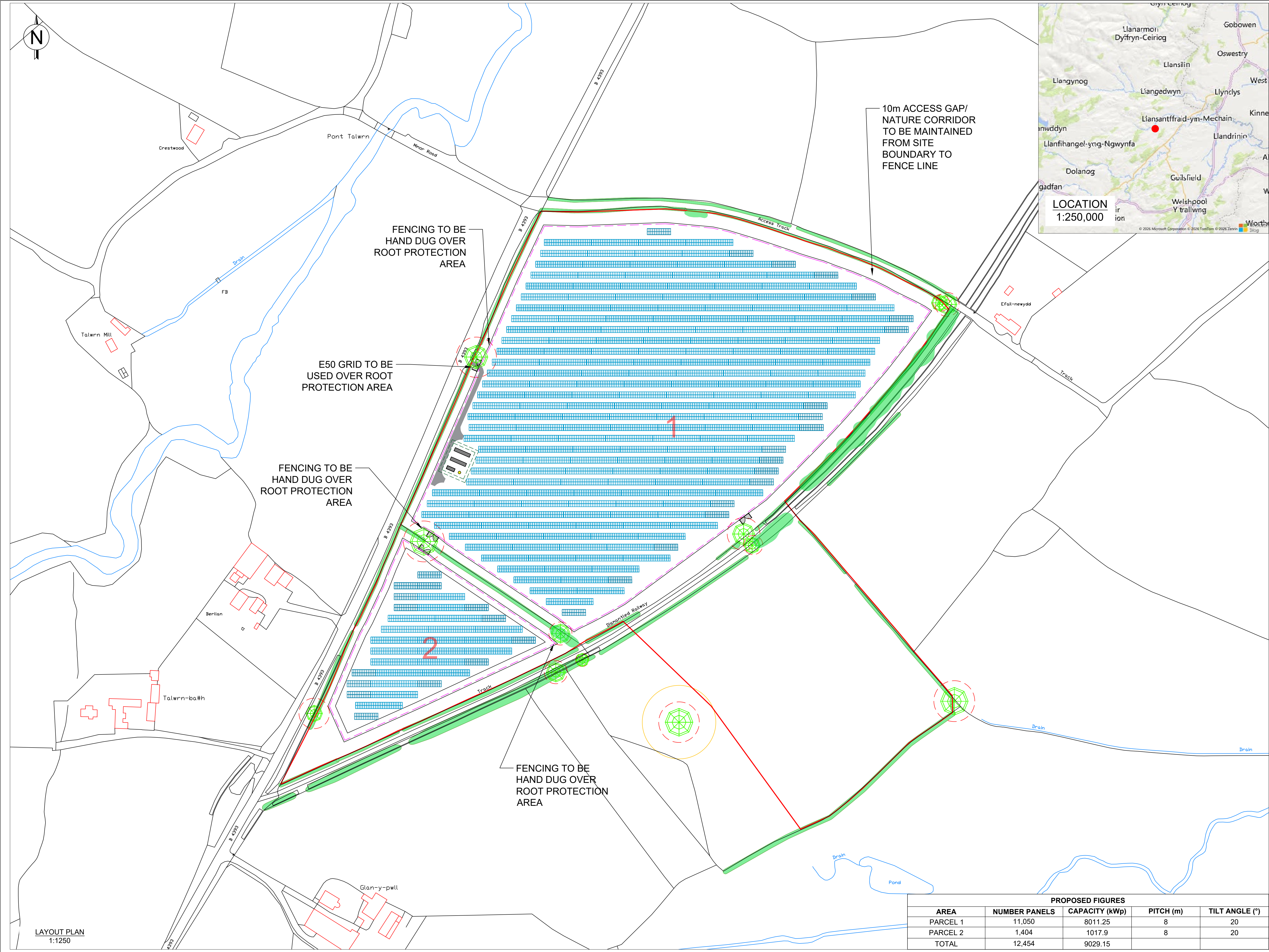
DATE:
10-04-2026

DRAWN: ER
CHECKED: AW
APPROVED: NJ
PLOT SCALE AT A3:
1:3000

PLOT NAME:
17112_LiDAR_Plan

REVISION:
-

Appendix C Proposed Development Plan



DRAWING KEY:	
	PLANNING BOUNDARY
	SITE LOCATION
	PROPOSED PV PANELS
	PROPOSED INVERTERS
	PROPOSED SUBSTATION
	PROPOSED MVS
	PROPOSED WEATHER STATION
	PROPOSED FENCES
	PROPOSED FIELD GATE
	PROPOSED GRAVEL ACCESS TRACK / TURNING AREA
	PROPOSED CCTV
	PROPOSED PALADIN FENCE
	EXISTING TREES
	ROOT PROTECTION AREAS
	SPECIAL IMPORTANCE BUFFER
	EXISTING HEDGEROWS / VEGETATION

DRAWING NOTES:	
SITE COORDINATES: 52.7626, -3.22196	
IN ROOT PROTECTION AREAS - E50 GRID TO BE USED ON FIELD ACCESS TRAVEL TRACKS - FENCING TO BE HAND DUG	
MINIMUM 5m MAINTENANCE STRIP TO BE MAINTAINED BETWEEN SITE BOUNDARY / HEDGEROWS AND PERIMETER FENCING.	
MINIMUM 10m MAINTENANCE STRIP TO BE MAINTAINED BETWEEN TREELINES AND PERIMETER FENCING.	
TREES / HEDGEROWS DEFINED BY DRAWING "BHA_7109_01 BS5837 Brogan Solar Farm TS"	

06	24.03.26	UPDATED PV AREAS AND FRAME PARAMETERS
05	04.03.26	UPDATED FENCE POSITIONS AND NOTATIONS
04	02.03.26	UPDATED FIELD ACCESS TRAVEL TRACK
03	02.03.26	UPDATED NOTATION AND GRAVEL ACCESS TRACK
02	25.02.26	UPDATED ACCESS POINTS, TRAVEL TRACK POSITIONS & SUBSTATION POSITION
01	23.02.26	FIRST RELEASE
REV.	DATE	DESCRIPTION

PROJECT TITLE:		
BROGAN SOLAR FARM		
DRAWING TITLE:		
PROPOSED LAYOUT PLAN		
DESIGN STAGE	PAGE SIZE	SCALE
DEVELOPMENT	A1	SHOWN
DRAWN BY:	DATE:	CHECKED BY:
LM	24.03.26	
DRAWING ID:	BGS.LYT.DEV.06	REV 06

Fuse Energy Ltd, Level39, One Canada Square, Canary Wharf E14 5AB
www.fuseenergy.com

USE FIGURED DIMENSIONS ONLY. ALL DIMENSIONS REQUIRE ON-SITE FIELD VERIFICATION. DO NOT SCALE.

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PROPOSED FIGURES				
AREA	NUMBER PANELS	CAPACITY (kWp)	PITCH (m)	TILT ANGLE (°)
PARCEL 1	11,050	8011.25	8	20
PARCEL 2	1,404	1017.9	8	20
TOTAL	12,454	9029.15		

Appendix D NRW Flood Mapping



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 an allowance for climate change

LEGEND

- Site Boundary
 - Land Parcel Split
 - TAN15 Defended Zones
- Flood Map for Planning
- Flood Zone 1
 - Flood Zone 2
 - Flood Zone 3



CLIENT:
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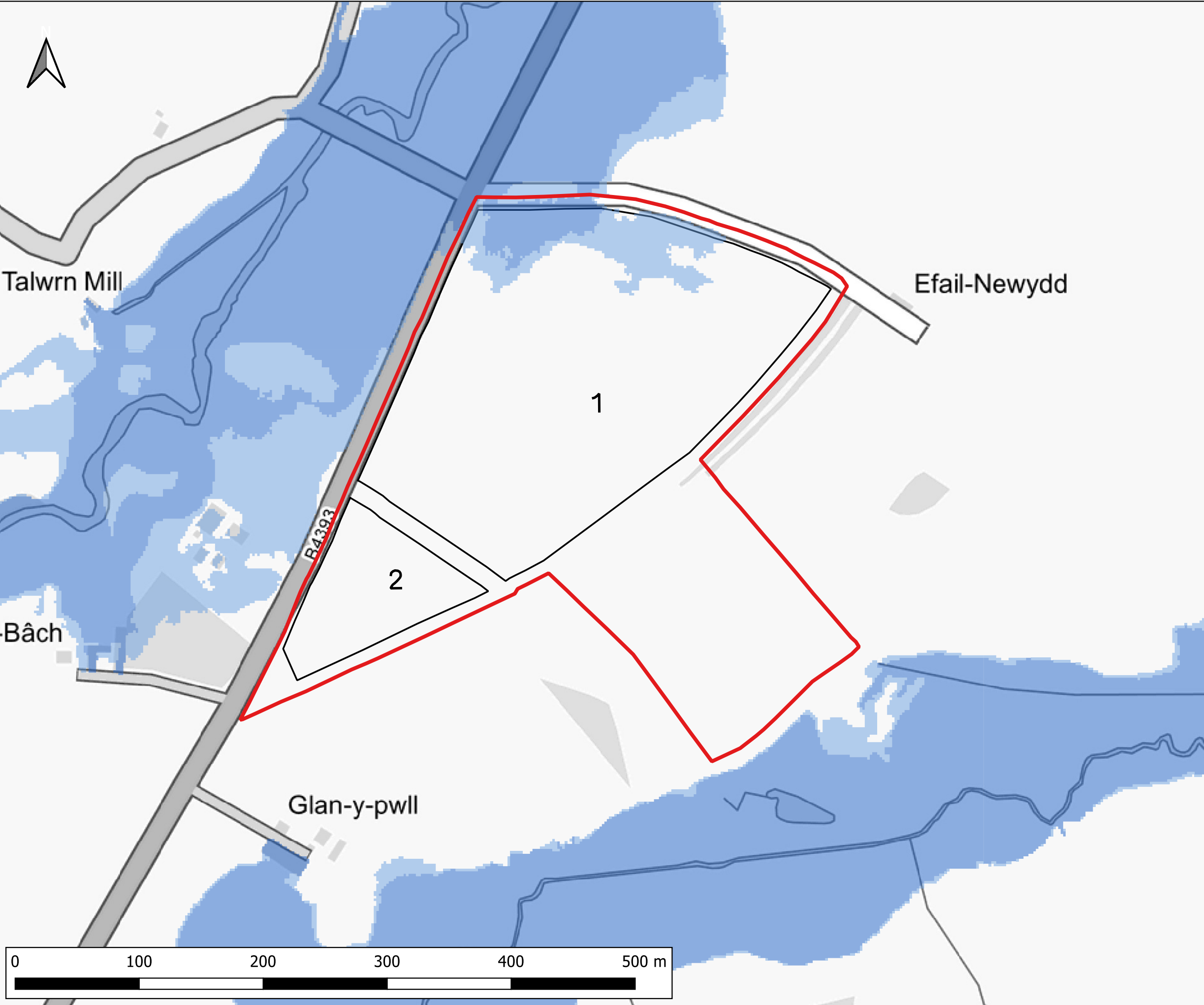
SCHEME:
Brogan Solar Farm, Llanfyllin

PLOT TITLE:
NRW Flood Map for Planning (Rivers and Sea)
Data published May 2025

PLOT STATUS: FINAL
DATE: 13-04-2026

DRAWN: ER	CHECKED: AW	APPROVED: NJ	PLOT SCALE AT A3: 1:3000
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PLOT NAME: 17112_NRW_FmFP	REVISION: -
---------------------------	-------------



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

LEGEND

Site Boundary

Land Parcel Split

Flood Zones - Rivers

Flood Zone 1

Flood Zone 2

Flood Zone 3

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SCHEME:

Brogan Solar Farm, LLanfyllin

PLOT TITLE:

NRW Flood Zones - Rivers
Data published May 2025

PLOT STATUS:

FINAL

DATE:

13-04-2026

DRAWN:

ER

CHECKED:

AW

APPROVED:

NJ

PLOT SCALE AT A3:

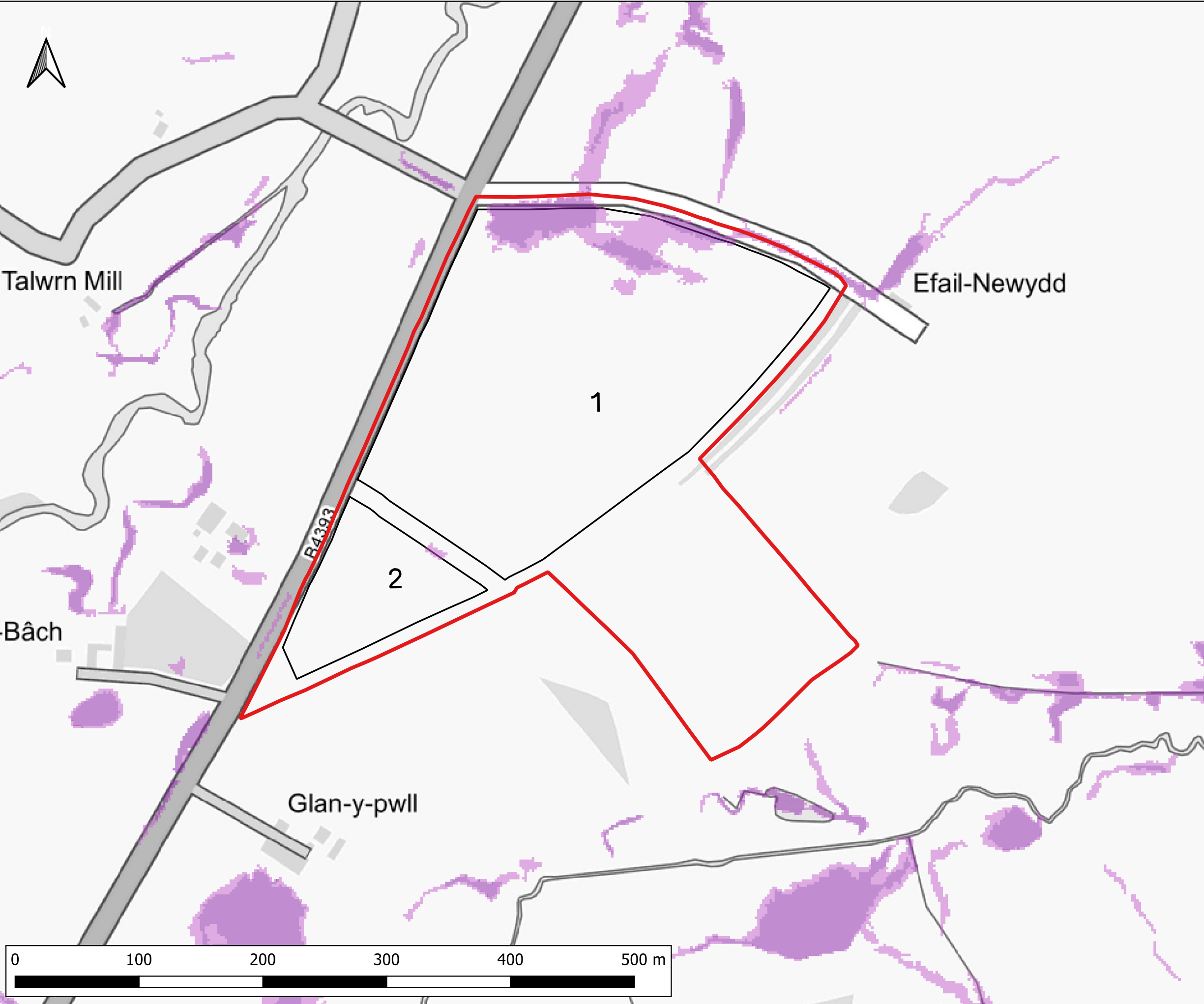
1:3000

PLOT NAME:

17112_NRW_Flood_Zones_Rivers

REVISION:

-



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

LEGEND

Site Boundary

Land Parcel Split

Flood Zones - Surface Water & Small Watercourses

Flood Zone 1

Flood Zone 2

Flood Zone 3

CLIENT:

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SCHEME:

Brogan Solar Farm, Llanfyllin

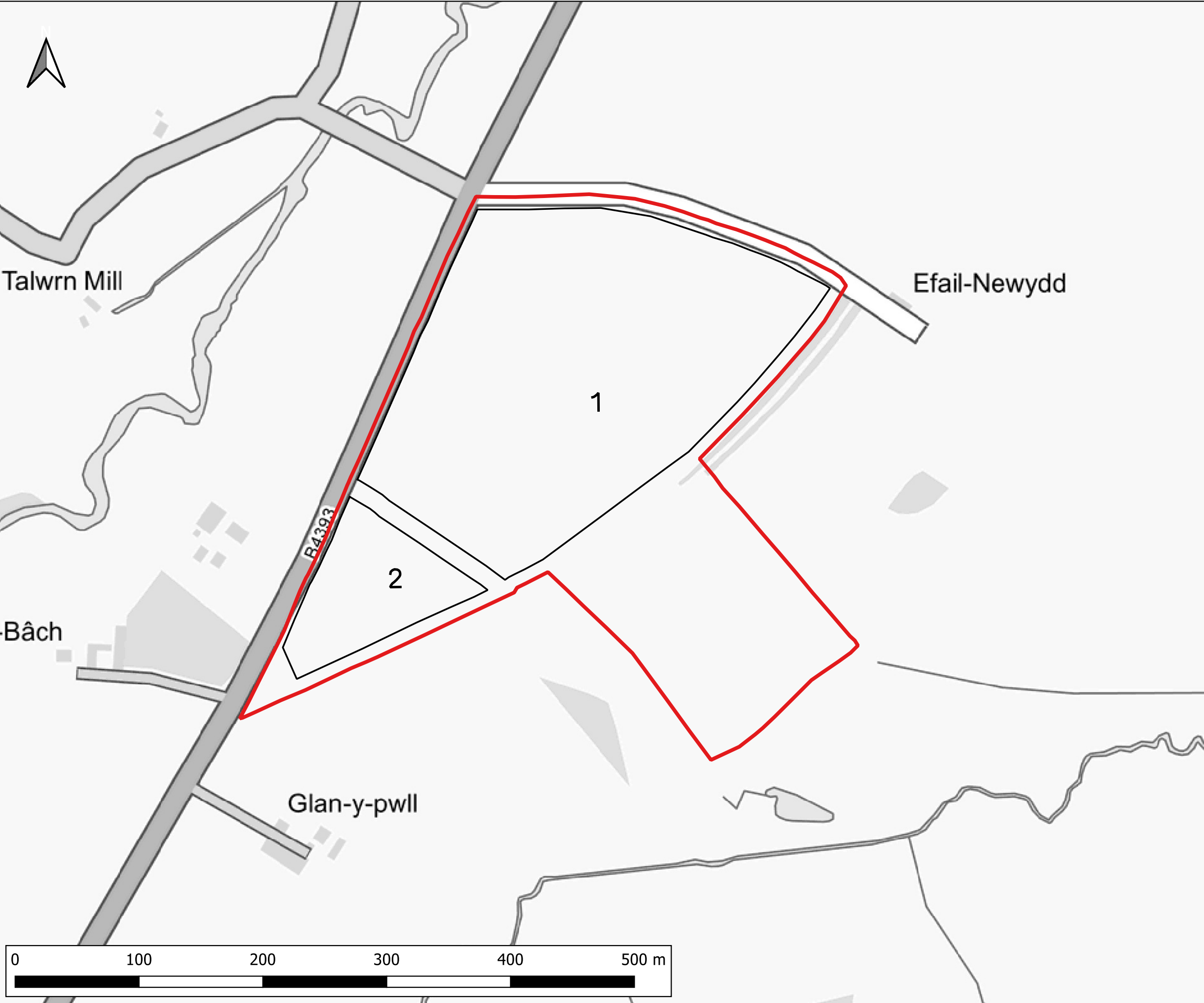
PLOT TITLE:

NRW Flood Zones - Surface Water & Small Watercourses
Data published May 2025

PLOT STATUS:		DATE:	
FINAL		13-04-2026	

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
ER	AW	NJ	1:3000

PLOT NAME:	REVISION:
17112_NRW_Flood_Zones_Surface_Water	-



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

LEGEND

Site Boundary

Land Parcel Split

Flood Zones - Sea

Flood Zone 1

Flood Zone 2

Flood Zone 3

CLIENT:

Fuse Renewables Ltd

www.waterco.co.uk

SCHEME:

Brogan Solar Farm, LLanfyllin

PLOT TITLE:

NRW Flood Risk from the Sea
Data published May 2025

PLOT STATUS:		DATE:	
FINAL		13-04-2026	

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
ER	AW	NJ	1:3000

PLOT NAME:	REVISION:
17112_NRW_Flood_Zones_Sea	-



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

LEGEND

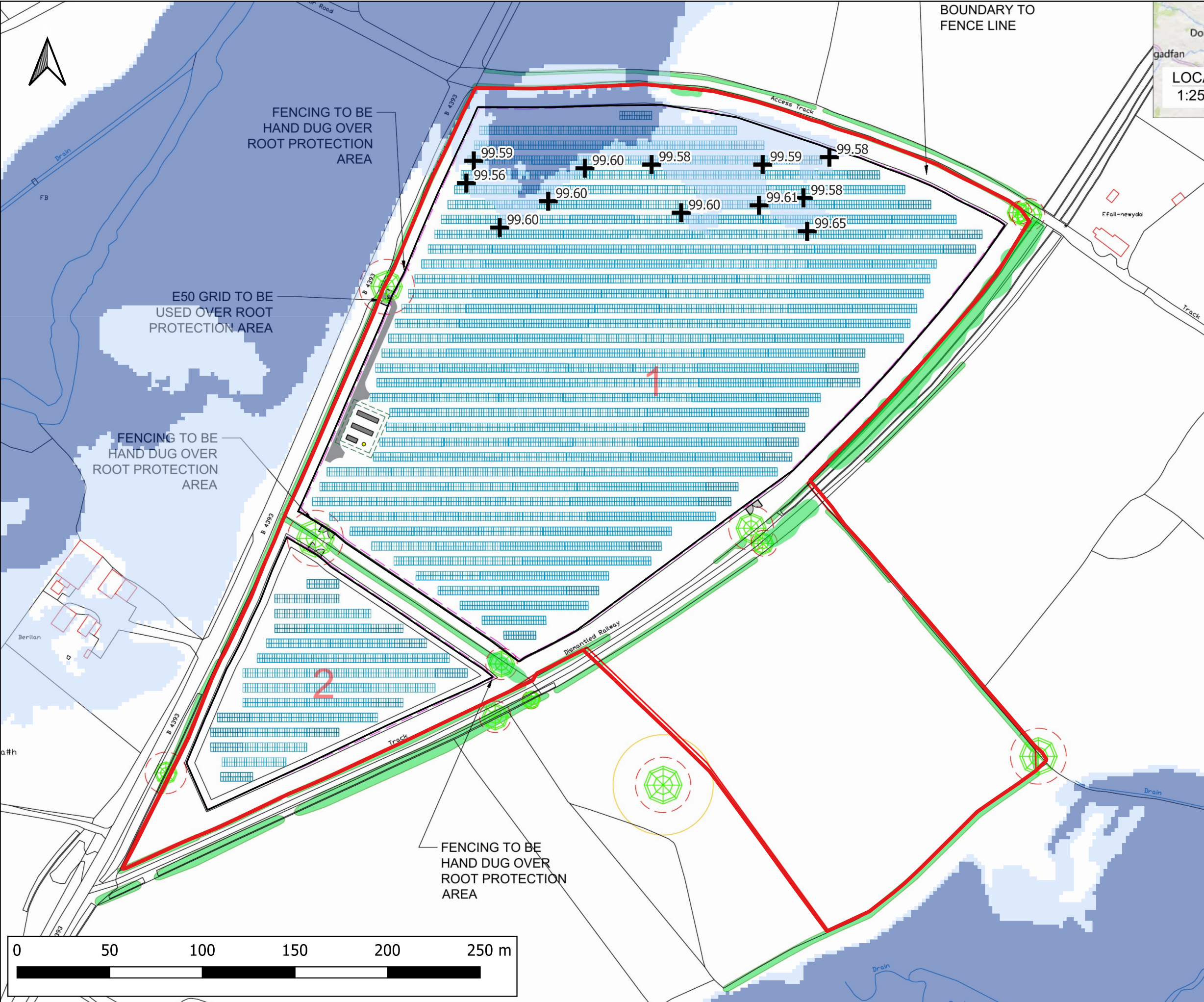
- Site Boundary
- NRW Recorded Flood Extents
- Land Parcel Split



CLIENT:			
Fuse Renewables Ltd			
 www.waterco.co.uk			
SCHEME:			
Brogan Solar Farm, LLanfyllin			
PLOT TITLE:			
NRW Recorded Flood Extents Data published May 2025			
PLOT STATUS:			DATE:
FINAL			13-04-2026
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
ER	AW	NJ	1:3000
PLOT NAME:			REVISION:
17112_NRW_Recorded_Flood_Extents			-

Appendix E Flood Map for Planning with LiDAR Overlay





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

LEGEND

- Site Boundary
- Land Parcel Split

NRW Flood Map for Planning

- Flood Zone 2
- Flood Zone 3

LOC 1:25

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SCHEME:

Brogan Solar Farm, LLanfyllin

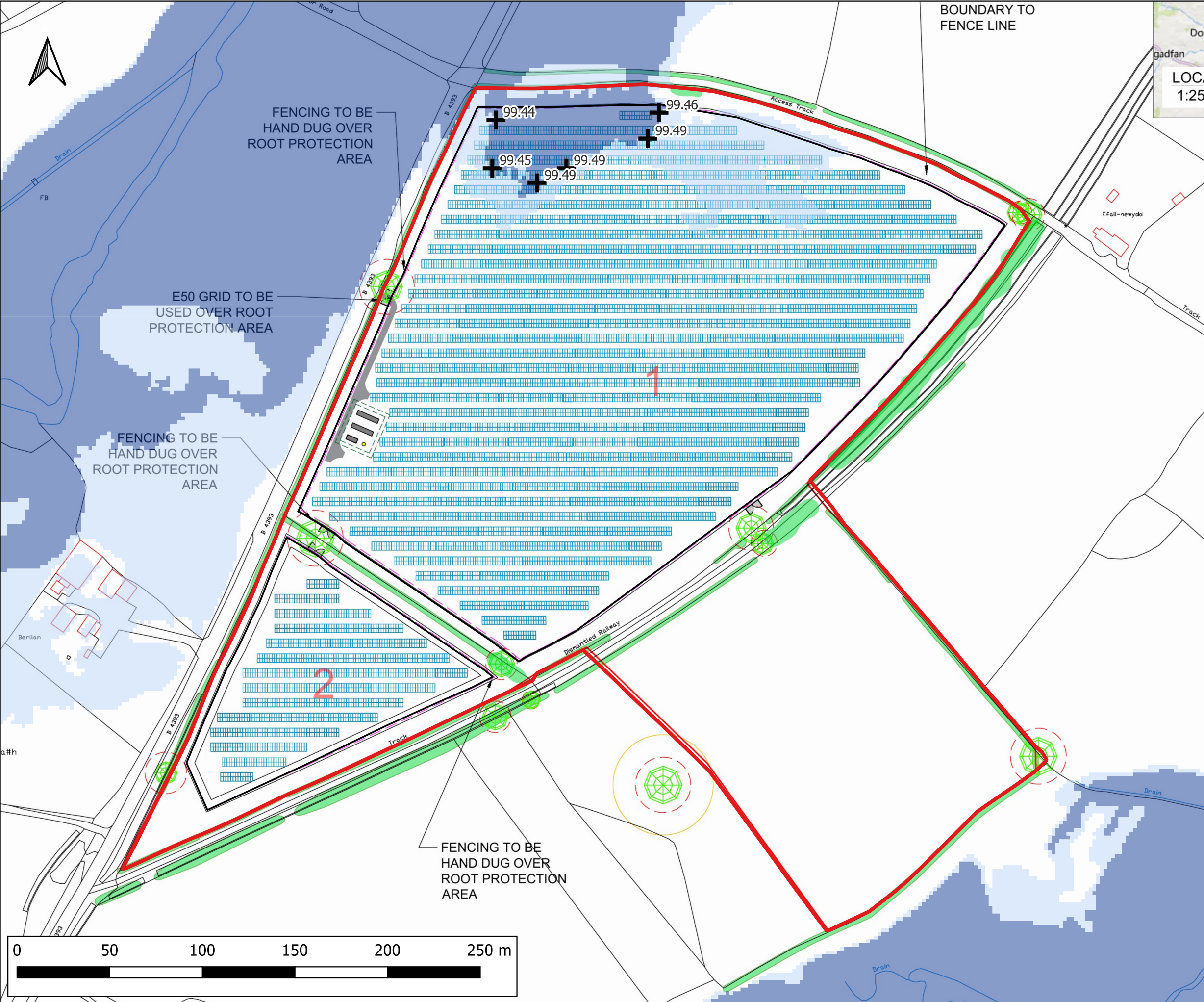
PLOT TITLE:

NRW Flood Map for Planning
Topographic Overlay

PLOT STATUS:		DATE:	
FINAL		10-04-2026	

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
LH	AW	NJ	1:2000

PLOT NAME:	REVISION:
17112_NRW_FMfP_Overlay	-



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

LEGEND

- Site Boundary
- Land Parcel Split

NRW Flood Map for Planning

- Flood Zone 2
- Flood Zone 3

LOC 1:25

Map inset showing Llanfyllin, Afon Cally, B4393, A490, Bwlch-y-cibau, W, ym, Hall, Llanfechain, gadfan, Efail-newydd, Track.

CLIENT:
Fuse Renewables Ltd

waterco
www.waterco.co.uk

SCHEME:
Brogan Solar Farm, Llanfyllin

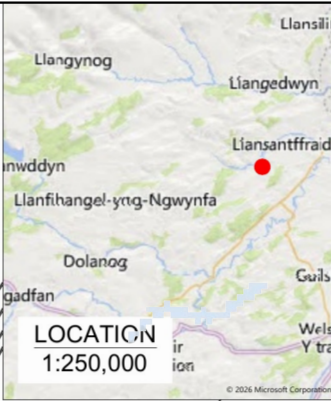
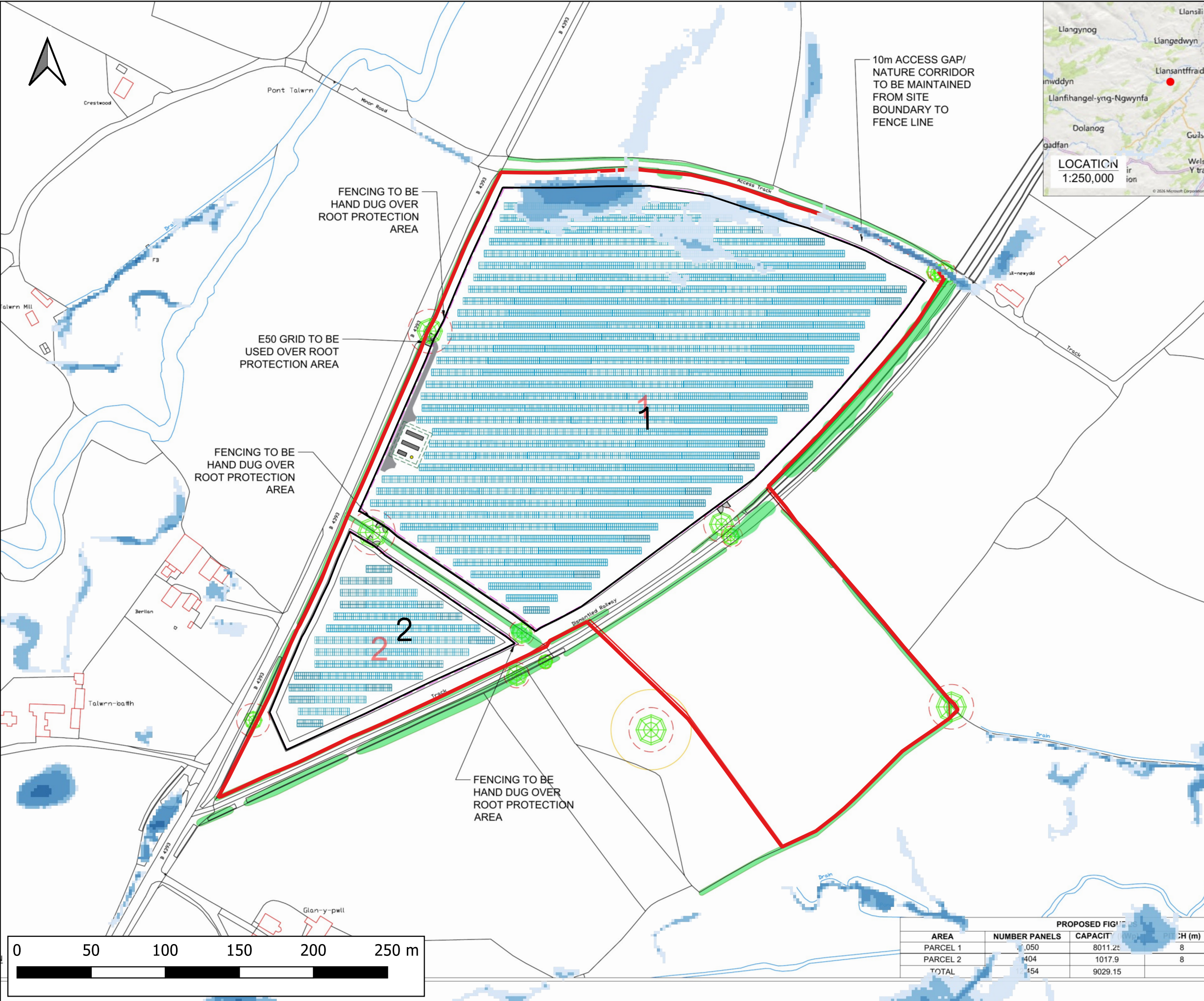
PLOT TITLE:
NRW Flood Map for Planning
Topographic Overlay

PLOT STATUS: FINAL DATE: 10-04-2026

DRAWN: LH CHECKED: AW APPROVED: NJ PLOT SCALE AT A3: 1:2000

PLOT NAME: 17112_NRW_FMfP_Overlay REVISION: -

Appendix F Surface Water Flood Depth Mapping



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

LEGEND

Site Boundary

Land Parcel Split

Surface Water Flood Depth (m)

	<= 0.2
	0.2 - 0.3
	0.3 - 0.6
	0.6 - 0.9
	> 0.9

CLIENT:

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waterco

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SCHEME:

Brogan Solar Farm, LLanfyllin

PLOT TITLE:

NRW - Surface Water Flood Depth Development Plan Overlay 0.1% AEP Event

PLOT STATUS:			DATE:
FINAL			10-04-2026

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
ER	AW	NJ	1:2500

PLOT NAME:	REVISION:
17112_NRW_SW_Depth_Overlay	-

Appendix G Concept Drainage Sketch

Appendix H Maintenance Schedules

Operation and Maintenance Requirements for Filter Drains

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Remove litter (including leaf litter) and debris from filter drain surface, access chambers and pre-treatment devices	Monthly (or as required)
	Inspect filter drain surface, inlet / outlet pipework and control systems for blockages, clogging, standing water and structural damage	Monthly
	Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies	Six monthly
	Remove sediment from pre-treatment devices	Six monthly, or as required
Occasional maintenance	Remove or control tree roots where they are encroaching the sides of the filter drain, using recommended methods (e.g. NJUG, 2007 or BS 3998:2010)	As required
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace overlying filter medium	Five yearly, or as required
	Clear perforated pipework of blockages	As required

Ref. Table 16.1, CIRIA C753 'The SuDS Manual'

The maintenance requirements detailed above are to be undertaken by the site owner.

Name :

Position :

Date :

Signed on behalf of the site owner :

Operation and Maintenance Requirements for Permeable Paving

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and move contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level or the paving	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Inspect for evidence of poor operation and / or weed growth – if required, take remedial action	Three-monthly, 48hr after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Ref. Table 20.15, CIRIA C753 'The SuDS Manual'

The maintenance requirements detailed above are to be undertaken by the site owner.

Name :

Position :

Date :

Signed on behalf of the site owner :

Appendix I Concept Designers Risk Assessment (cDRA)

Project: Brogan Solar Farm, Llanfyllin
Client: Fuse Renewables Ltd
Report Reference: 17112-FCA&Drainage Strategy-01

Project No: 17112

Prepared by:	Adam McCulloch	Date:	23/01/2026
Checked by:	Jack Pugh	Date:	23/01/2026
Reviewed by:	Aled Williams	Date:	23/01/2026

Requirement:

The Construction (Design and Management) Regulations 2015 (CDM 2015) place an obligation on the Designer to take all reasonable steps to provide, with the design, sufficient information about the design, construction or maintenance of the structure, to adequately assist the client, other designers and contractors to comply with their duties under CDM. The Designer has undertaken this assessment to identify any extra-ordinary risks, or those that would not be expected on this particular project by an experienced and competent Contractor. The aim is to avoid needless paperwork and bureaucracy and ensure the assessment is project specific, relevant and proportionate to the risk.

DRA Summary

Each of the following risk areas has been considered using the question below. Is a risk present which is considered to be **extra-ordinary or unexpected** in this instance?

If **YES** - A detailed risk assessment is required at design stage

If **UNKNOWN** - Insufficient information has been provided at concept design stage and the risks are unknown. Further consideration must be given at design stage(s)

If **NO** - No further action is required.

Hazard Ref.	Risk Areas	YES, UNKNOWN or NO	Comments
1	Ground Conditions	Unknown	To be considered at detailed design.
2	Hazardous Environment	Unknown	To be considered at detailed design.
3	Existing Working Environment	Unknown	To be considered at detailed design.
4	Existing Services	Unknown	To be considered at detailed design.
5	Proximity to Other Structure(s)	Unknown	To be considered at detailed design.
6	Near Waterbody / flood risk	Yes	The River Cain which is located 70m northwest. Minimal Flood Risk.
7	Proximity to Other Activities	Unknown	To be considered at detailed design.
8	Sequence of Construction	Unknown	To be considered at detailed design.
9	Access	Unknown	Provided from an unnamed access road off the B4393.
10	Interfaces	Unknown	To be considered at detailed design.
11	Confined Space Working	No	To be considered at detailed design.
12	Maintenance Considerations	Unknown	Permeable Surfacing and filter drains proposed.
13	Working at Height	Unknown	To be considered at detailed design.
14	Steep Slopes	No	Gradual slopes across all land parcels.
15	Demolition / Refurbishment / Repair	Unknown	To be considered at detailed design.
16	Welfare	Unknown	To be considered at detailed design.
17	Occupational Health	Unknown	To be considered at detailed design.
18	Environmental Issues	Unknown	To be considered at detailed design.
19	Other Significant Hazards not Identified Above	Unknown	To be considered at detailed design.
20	Residual Risk to Future Users	Unknown	To be considered at detailed design.