

# Parc Solar Caenewydd, Swansea

## FLOOD CONSEQUENCE ASSESSMENT

Development of National Significance in the Renewable Energy Sector  
Application Submission



# FLOOD CONSEQUENCE ASSESSMENT

PARK SOLAR CAENEWYDD,

ON BEHALF OF TAIYO POWER AND STORAGE LTD



## Pegasus Group

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## 1. INTRODUCTION

### Background

- 1.1 Pegasus Group Ltd has been appointed by Taiyo Power & Storage Limited (herein referred to as “the Applicant<sup>1</sup>”) to undertake a Flood Consequence Assessment (FCA) for a proposed Non-EIA<sup>1</sup> utility-scale solar and battery storage facility on land fronting the A484 and Swansea Road (B4560) at Gowerton, Swansea. It will deliver a host of landscape, biodiversity, soil and hydrological enhancements. The proposal includes measures to strengthen habitat connectivity through this part of the valley, the creation of green buffer zones and public right of ways improvements. The development is called ‘Parc Solar Caenewydd’.
- 1.2 This Flood Consequence Assessment forms part of a suite of documents supporting a planning application for Development of National Significance for the construction, operation, management and subsequent decommissioning of a co-located solar farm and battery storage facility on land fronting the A484 and Swansea Road (B4560) at Gowerton, Swansea (“the application site”).
- 1.3 The Flood Consequence Assessment is being published to accompany the Surface Water Drainage Strategy and is further to a pre-application carried out under Articles 8 and 9 of the Development of National Significance (Procedure) (Wales) Order 2016.
- 1.4 The development prioritises conforming with the designations for the landscape and nature conservation areas by including designs for green infrastructure and wildlife habitat improvements across the fields.
- 1.5 Land within the solar array areas will be available post-construction for continued agricultural use for the duration of the development as the fields will be capable of being grazed by sheep.
- 1.6 This assessment considers the risks of all types of flooding to the site including tidal, fluvial, surface water (pluvial), historic, groundwater, sewer and artificial

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<sup>1</sup> On August 2022, Planning & Environmental Decision Wales adopted its Environmental Impact Assessment (EIA) Screening Direction. The Welsh Ministers direct that the development is not EIA development within the meaning of the Regulations.

sources. It also includes a drainage strategy and betterment plan to manage surface water runoff, no foul water will be produced by the development.

#### Preliminary Flood Risk Assessment

1.7 The City and County of Swansea undertook a Preliminary Flood Risk Assessment (PFRA) in May 2011 on behalf of City and Country of Swansea.

1.8 This report is used to inform any site within the catchment area that requires a site-specific FRA.

1.9 The key objectives of the 2011 PFRA are:

*- The PFRA is a high level screening exercise to identify areas of significant risk, based on available and readily derivable information, describing both probability and harmful consequences of past and future flooding on human health, the environment, cultural heritage and economic activity.*

*- This PFRA will provide a strategic assessment of flood risk within the City and County of Swansea study area using the guidance from Welsh Assembly Government, Defra and the Environment Agency for identifying 'significant' flood risk areas.*

*- The PFRA for the City and County of Swansea is intended to:*

- Assess local sources of flood risk and to identify areas that are potentially significant flood risk*
- Include, as sources of flood risk, surface water run-off, groundwater, ordinary watercourses, and any interaction with main rivers, sea, reservoirs and other artificial water-bearing infrastructure*
- Collate information on past and future floods and their consequences*
- Provide a summary of datasets*
- Review Indicative Flood Risk Areas provided by the Environment Agency*
- Assess the potential harmful consequences of future floods within the study area*
- Describe arrangements for partnership and collaboration for ongoing collection, assessment and storage of flood risk data and information.*

- *The PFRA has been carried out by using the Key Principles as directed by Defra:*

- *Select only the highest risk areas for the first round.*
- *Use readily available information or derivable information (a directive requirement Focus on forward looking assessments, but maintain other information for future use*
- *Consider risk from a rainfall event which is approximately comparable to a 1 in 200 year flooding in any year*
- *Focus on assessing indicators of significant consequences particularly considering the impact on people from local flooding*
- *Consider multiple sources of flooding and residual risk where possible.*
- *Adopt consistent scales of assessment i.e., 1km<sup>2</sup>*

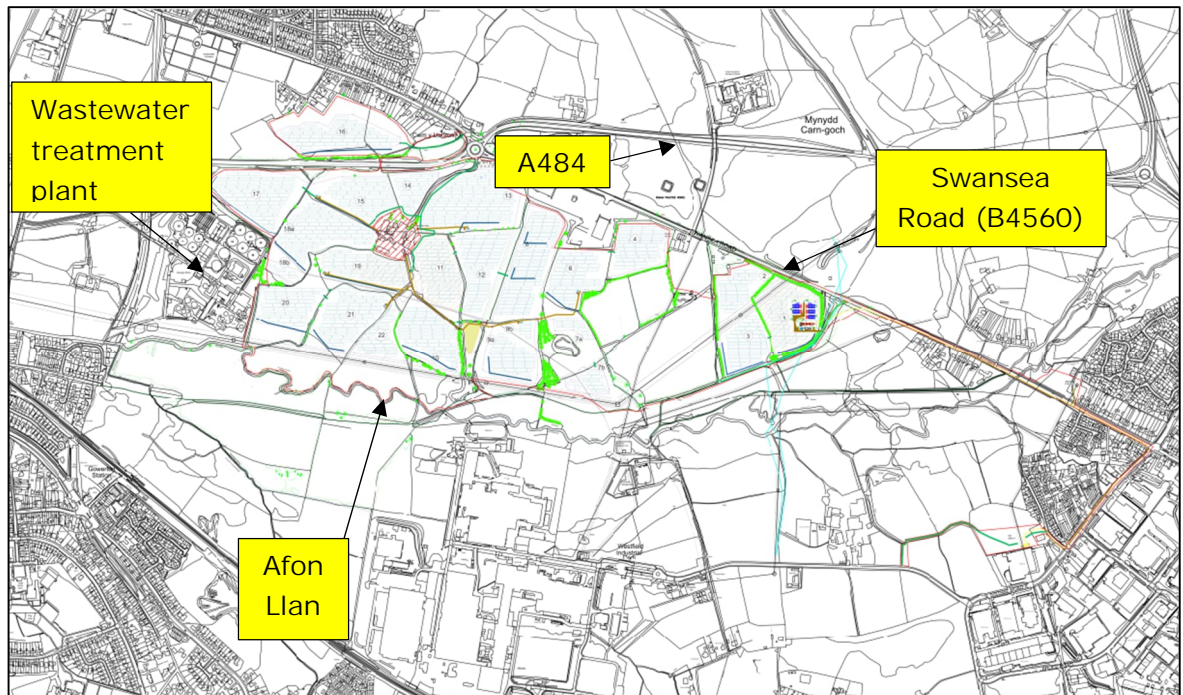
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## 2. EXISTING SITE AND HYDROLOGY

### Site Location & Existing Conditions

- 2.1 The site consists of agricultural fields which are accessed from A484 that runs along the northern site boundary. The Site is bounded by a wastewater treatment plant to the west, Gors-fawr Brook and greenfield area to the south and east and Swansea Road (B4560) and A484 to the north side.
- 2.2 The southern edge of the site has an existing watercourse (Afon Llan) flowing from the east side to the west side of the site. There are various ditches running throughout the site that are shown to be in connectivity with Afon Llan. Shrubs provide field outlines and boundaries.
- 2.3 Approximate site co-ordinates are E: 260031; N: 197076, with the nearest post code SA4 4LN.
- 2.4 The Natural Resources Wales Development Advice Map shows the northern upper slopes of the valley to be in Flood Zone A “considered to be at little or no risk of fluvial or coastal/tidal flooding”, whilst the lower fields adjacent to the river are indicated to be in Flood Zone B “areas known to have flooded in the past” and C2 “without significant flood defence infrastructure”.
- 2.5 A copy of the NRW Development Advice Map can be found at Section 6 of this report.

Figure 2.1 – Site Location



2.6 A site-specific topographical survey has been undertaken by Mining Surveys (UK) Ltd in December 2021 (Dwg. No GO/TPS/HV/002) and it shows the site falls in a southern direction towards the Afon Llan.

2.7 The topographical survey can be found at Appendix A.

#### Existing Drainage and Hydrology

2.8 There are several watercourses running in the immediate vicinity and through the site. The Afon Llan along the south of the site from the east to the west. Gors-fawr Brook runs along the southern boundary from the east to the west. There are several unnamed ditches flowing in a southerly direction, draining towards Afon Llan watercourse within the development boundary.

2.9 Geological data held by the British Geological Survey (BGS) indicates that the bedrock geology underlying the site is "Grovesend Formation" – which is shown to be a mix of Mudstone, Siltstone and Sandstone. The Soilscape soils data shows the site as "Lime-rich loamy and clayey soils with impeded drainage".



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### 3. PROPOSED DEVELOPMENT

- 3.1 It is proposed to develop the site as an enhanced valley of green infrastructure and biodiverse habits interspersed with a solar power and battery storage facility.
- 3.2 The existing site area is entirely 'greenfield' development with areas of trees and vegetation along the perimeter boundaries, therefore the majority of the site is considered to be permeable. The nature of the proposals consists of mainly solar panel modules which are raised off the ground, therefore not creating any impermeable areas. The only areas of impermeable nature will be the substation/power station units. New access roads will be constructed of a permeable nature, typically mown grass / reinforced grass / reinforced gravel.
- 3.3 The development prioritises conforming with the designations for the landscape and nature conservation areas by including designs for green infrastructure and wildlife habitat improvements across the fields of the site. The development will comprise of solar arrays on supports driven into the ground, linked by underground cables to inverters/transformers and substations which will feed energy into the grid.
- 3.4 Land within the solar array areas will be available for continued agricultural use for the duration of the development as the fields will be capable of being grazed by sheep.
- 3.5 A copy of the proposed site layout can be found at Appendix B.

#### 4. NATIONAL AND LOCAL POLICIES

##### Technical Advice Note 15 (TAN15) – July 2004

- 4.1 Planning Policy Wales (PPW) have provided a Technical Advice Note 15 (TAN15) called Development and Flood Risk, dated July 2004. The general approach is to advise caution in respect of new development in areas at high risk of flooding by setting out a precautionary framework to guide planning decisions.
- 4.2 The aim of the precautionary framework is, in order of preference:
- Direct new development away from those areas which are at high risk of flooding.
  - Where development has to be considered in high-risk zones (sone C) only those developments which can be justified on the bases of the test outlined within the note are located within such areas.
- 4.3 TAN 15 should be read with the NRW Development Advice Mapping which shows the site is located predominantly in Flood Zone A with the southern part shown within Flood Zones B & C2.
- 4.4 TAN15 classifies Solar Farms as “less vulnerable development” as it can be considered that the development falls under “utilities infrastructure”. TAN15 notes that Flood Zone C2 is used to indicate that only less vulnerable development should be considered subject to application of the justification test, including the acceptability of consequences.
- 4.5 Development will only be justified if it can be demonstrated that:
- I. Its location in Zone C is necessary to assist, or be part of, a local authority regeneration initiative or local authority strategy required to sustain an existing settlement.  
OR
  - II. Its location in Zone C is necessary to contribute to key employment objectives supported by the local authority, and other key partners, to sustain an existing settlement or region.  
AND

- III. It concurs with the aims of PPW and meets the definition of previously developed land.
- IV. The potential consequences of a flooding event for the particular type of development have been considered and found to be acceptable.
- 4.6 The development is located partially within Zone C and is necessary to contribute to key employment objectives supported by the local authority and other key partners to sustain an existing settlement or region in relation to part II of the above.
- 4.7 Part IV is addressed throughout this report in the assessment of current flood risk and how the development will not increase the risk of flooding within the site boundary or to surrounding sites.

Technical Advice Note 15 (TAN15) – June 2023

- 4.8 A new version of TAN15 was released in December 2021 and is due to be adopted. This section sets out the aims of TAN15 June 2023 in addition to the suitability of the development as assessed in the TAN.
- 4.9 The National Strategy recognises the varying degrees of flood risk, now and in the future. The overarching aim when considering new development is to prevent exposure to risk, by making locational choices in the following order of preference:
- Direct new development to areas at minimal risk of flooding – areas in Zone 1,
  - Enable resilient development in areas served by formal flood risk management defences that reduce the risk and consequences of flooding over the lifetime of development – areas in the TAN 15 Defended Zones,
  - Allow resilient development in undefended areas of relatively low risk – areas in Zone 2,
  - Only permit water compatible development, essential infrastructure, and less vulnerable developments by exception in areas of higher risk – areas in Zones 3.

4.10 The approach is based on:

- A Flood Map for Planning showing flood zones which trigger justification and acceptability tests,
- Defining development types by their vulnerability in flood events,
- Advice on permissible uses in relation to the location of development and the consequences of flooding,
- Planning authorities incorporating local flood risk considerations into their planning policies and decisions.

4.11 The approach applies to both Development Planning and Development Management processes.

#### Justifying the location of development

4.12 Development in Zone 1 is acceptable in principle in relation to flood risk, providing it does not cause any increase in flood risk elsewhere. Where development is proposed in a flood risk area facing risk from rivers and the sea, the planning authority will need to be satisfied that its location is justified. It is important that areas in Zone 3 are used only as a last resort, and not at all for new highly vulnerable development. More flexibility is permitted in Zone 2 and the TAN 15 Defended Zones, where formal defence infrastructure provides a good standard of protection against flooding.

4.13 The advice in this section is specific to flooding considerations from rivers and the sea. Other planning considerations will apply in every circumstance, including the need to comply with national and local planning policies.

#### Zone 1

4.14 All types of development are acceptable in principle. Planning authorities should develop locally specific planning policies for localised areas at risk of flooding.

#### TAN 15 Defended Zones

4.15 Development will be justified in the TAN 15 Defended Zones if:

- Its location meets the definition of previously developed land; AND
- The potential consequences of a flooding event for the particular type of development have been considered.

Zone 2 (Rivers and Sea)

4.16 Development will be justified in Zone 2 if:

- It will assist, or be part of, a strategy supported by the Development Plan to regenerate an existing settlement or achieve key economic or environmental objectives; AND
- Its location meets the definition of previously developed land; AND
- The potential consequences of a flooding event for the particular type of development have been considered and found to be acceptable.

Zone 3 (Rivers and Sea)

4.17 Less vulnerable development will only be justified if:

- There are exceptional circumstances that require its location in Zone 3, such as the interests of national security, energy security, public health or to mitigate the impacts of climate change; AND
- Its location meets the definition of previously developed land; AND
- The potential consequences of a flooding event for the particular type of development have been considered.

4.18 New highly vulnerable developments must not be permitted in Zone 3.

4.19 Water compatible development is acceptable, from a flooding perspective, in all flood zones.

4.20 As the development falls under 'Less Vulnerable' category and partly sits within Flood Zone 3, it is necessary to justify that the development is considered appropriate in this area:

- 'There are exceptional circumstances that require its location in Zone 3, such as the interests of national security, energy security, public health or to mitigate the impacts of climate change' - The development is partly located within Zone 3 and is necessary to contribute to key employment objectives supported by the local authority and other key partners to sustain an existing settlement.
- 'Its location meets the definition of previously developed land' – there is a conflict in principle and as such, the merits of the development will be assessed against the wider merits and planning balance of the development.
- 'The potential consequences of a flooding event for the particular type of development have been considered.' – this part is then addressed throughout this report in the assessment of current flood risk and how the development will not increase the risk of flooding within the site boundary or to surrounding sites.

#### SuDS Approval Body (SAB)

- 4.21 Since January 2019, the Sustainable Approval Body (SAB) was introduced in Wales and is applicable to all sites with more than 1 dwelling and over 100m<sup>2</sup>. An application for approval of the proposed drainage for any site development has to be approved by the SAB and is separate from any planning application.
- 4.22 As such, any new application will require a surface water drainage scheme submitted to accompany all planning applications and will be required to demonstrate the use of SuDS within the design.

#### Future Wales and Planning Policy Wales

- 4.23 The Natural Resources Policy identifies the key priorities, risks and opportunities to achieve the sustainable management of natural resources, including addressing the climate emergency and reversing biodiversity decline. Its objectives are to maintain and enhance the resilience of ecosystems and the benefits they provide. Planning Policy Wales outlines how the planning system should contribute towards these goals and Future Wales builds on this policy by setting out specific policies that:

- safeguard areas for the purposes of improving the resilience of ecological networks and ecosystems services, to identify areas for the provision of green infrastructure and to secure biodiversity enhancement (net benefit),
  - ensure resilient location and design choices by promoting a sustainable growth strategy as well as ensuring the consideration of natural resources and health and well-being form part of site and design choices and
  - facilitate the decarbonisation of the economy, including energy and transport choices, and promote the principles of a circular economy.
- 4.24 The Future Wales National plan 2040 states in Policy 8: Flood risk management that enables and supports sustainable strategic growth and regeneration in National and Regional Growth Areas will be supported. The Welsh Government will work with Flood Risk Management Authorities and developers to plan and invest in new and improved infrastructure, promoting nature-based solutions as a priority. Opportunities for multiple social, economic and environmental benefits must be maximised when investing in flood risk management infrastructure. It must be ensured that projects do not have adverse impacts on international and national statutory designated sites for nature conservation and the features for which they have been designated.
- 4.25 The Future Wales Policy 17 emphasises that the Welsh Government strongly support the development of renewable and low carbon energy of all forms and scales. In determining planning application, Policy 17 states that “decision-makers must give significant weight to the need to meet Wales’ international commitments and our target to generate 70% of consumed electricity by renewable means by 2030 in order to combat the climate emergency”. Policy 18 of Future Wales states that “proposals for renewable and low carbon energy projects qualifying as DNS will be permitted subject to Policy 17 and criteria identified by Policy 18.”
- 4.26 Planning authorities should include these areas and/or opportunities in their development plan strategies and policies in order to promote and safeguard the functions and opportunities they provide. In all cases, action towards securing the maintenance and enhancement of biodiversity (to provide a net benefit), the resilience of ecosystems and green infrastructure assets must be

demonstrated as part of development proposals through innovative, nature-based approaches to site planning and the design of the built environment.

Swansea Local Development Plan, 2010-2025 (SLDP)

- 4.27 The SLDP contains various policies including Policy RP5 relating to flood risk that would be directly applicable to the development.
- 4.28 The overriding principles of this policy are that to avoid the risk of flooding, development will not be permitted:
- i. In areas at risk of fluvial, pluvial, coastal and reservoir flooding, unless it can be demonstrated that the development can be justified in-line with national guidance and is supported by a technical assessment that verifies that the new development is designed to alleviate the threat and consequences of flooding;
  - ii. In areas at risk of flooding from local sources, unless the Council is satisfied with the proposed drainage strategy;
  - iii. Where it would lead to an increase in the risk of flooding on the site or elsewhere from fluvial, pluvial, coastal or increased water run-off from the site;
  - iv. Where it would have a detrimental effect on the integrity of existing fluvial, pluvial or coastal flood defences;
  - v. Where it would impede access to existing and future tidal and fluvial defences for maintenance and emergency purposes; or
  - vi. Where the proposal does not incorporate environmentally sympathetic flood risk mitigation measures, such as SuDS, unless it can be demonstrated that such measures are not feasible.
- 4.29 Policy RP5 directs that a sustainable approach to flooding is to be adopted by avoiding flood hazard areas with expected consideration and compliance with the requirements set out in TAN 15 Development and Flood Risk (2004). The intended approach to this is set out at paragraphs 4.1 to 4.7 above.



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## 5. EXISTING DRAINAGE AND HYDROLOGY

- 5.1 There is a main watercourse running along the southern boundary of the site (Afon Llan) and will require a 6.0 – 9.0m easement either side to allow for maintenance. Such separation has been included within the proposed Site Layout plan.
- 5.2 The site is currently a permeable greenfield site that allows surface water run-off to drain naturally to ground and toward the existing watercourses.
- 5.3 There are several other small watercourses/ditches located across the site and if these are maintained will also require an easement either side.
- 5.4 The underlying ground conditions are shown as Mudstone, Siltstone and Sandstone formation with Sand and Gravel deposits.
- 5.5 The topography of the site falls north to south toward the Afon Llan.

## 6. SITE SPECIFIC FLOODING ISSUES AND EXISTING FLOOD RECORDS

6.1 This report considers the flood risk to the development based on the following sources, which will be reviewed by the NRW and the LLFA (The City and County of Swansea County):

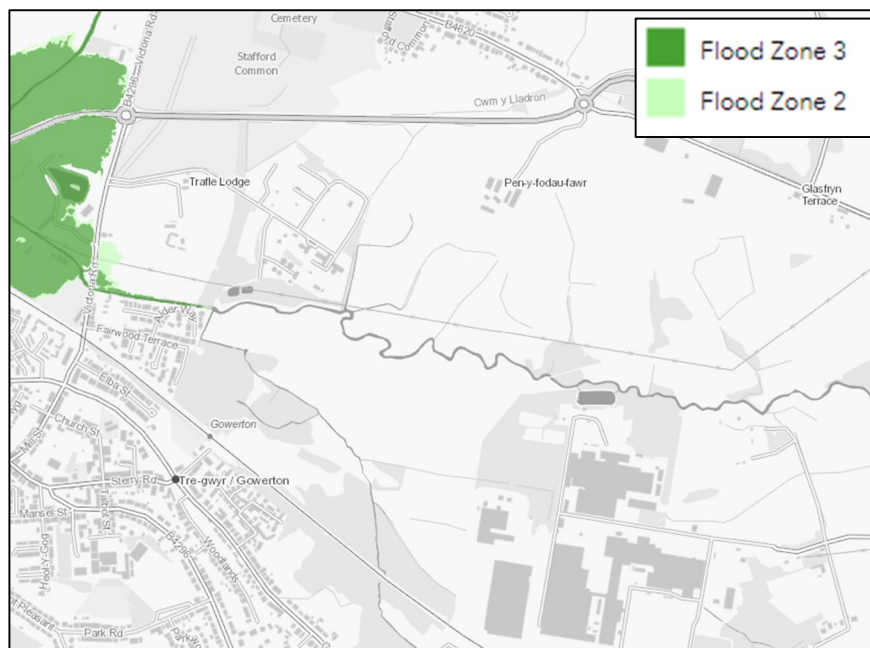
- a) Tidal Flooding – from sea;
- b) Fluvial Flooding – from rivers and streams;
- c) Pluvial Flooding – overland surface water flow and exceedance;
- d) Historic flooding – known historic flooding issues;
- e) Flooding from sewers – exceedance flows from existing sewer systems; and
- g) Artificial sources – reservoirs, canals, etc.

6.2 The NRW website provides a Development Advice Map (DMA) and a secondary detailed Flood Map for Planning (FMfP) as a general guide to whether a site is at risk of flooding from various sources including rivers and sea.

### Tidal Flooding

6.3 The FMfP (Figure 6.1) indicates that the site is at no risk of flooding from the Sea with the entire site being located within Flood Zone 1, therefore the site is at very low risk from flooding of this source.

Figure 6.1 – NRW Sea Flood Map for Planning (FMfP)



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### Fluvial Flooding

- 6.4 The NRW website provides a Development Advice Map (DAM) and a secondary detailed Flood Map for Planning (FMfP) as a general guide to whether a site is at risk of flooding from various sources including rivers and sea.
- 6.5 The DAM (Figure 6.2) indicates that the site is predominantly located within Flood Zone A, an area with a low probability of flooding occurring with the southern part of the site located in Flood Zones B and C2, which is at a higher risk of flooding or has had recorded flooding in the past.
- 6.6 The FMfP (Figure 6.3) indicates that the site is predominantly in Flood Zone 1 with the southern part of the mostly within Flood Zone 3.
- 6.7 The higher risk of flooding are caused by both the Afon Llan, running along the southern boundary of the site.
- 6.8 As noted above, the risk to the site from River flooding is considered to be High in the most southern part of the site panels have been removed from the southern fields of the Afon Llan but a small area is still affected by river flooding, just to a lesser extent.

Figure 6.2 – Development Advice Map (DAM)

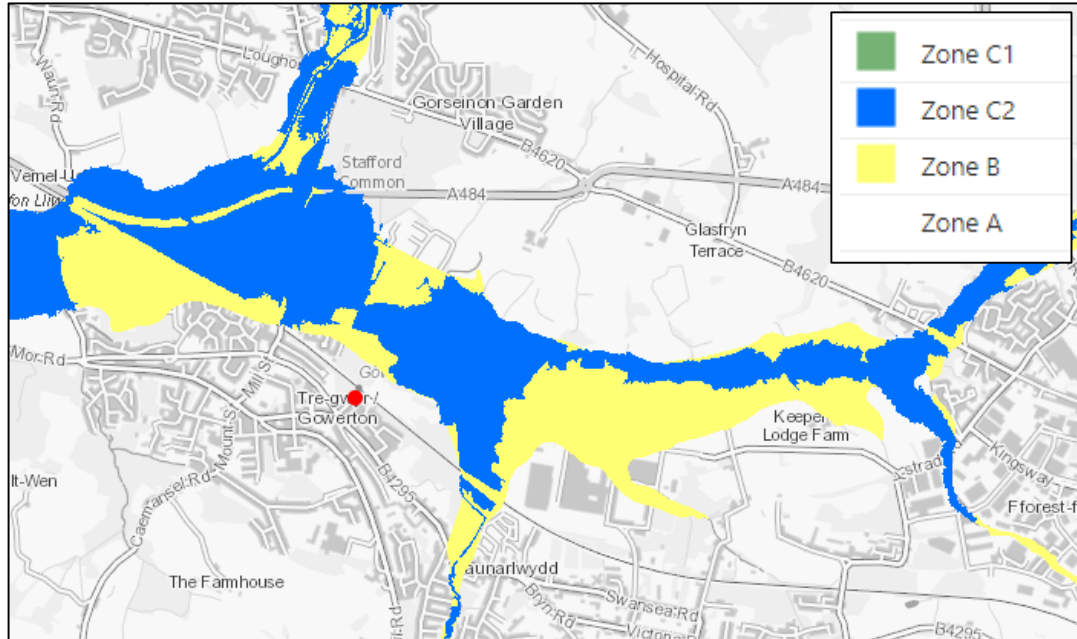
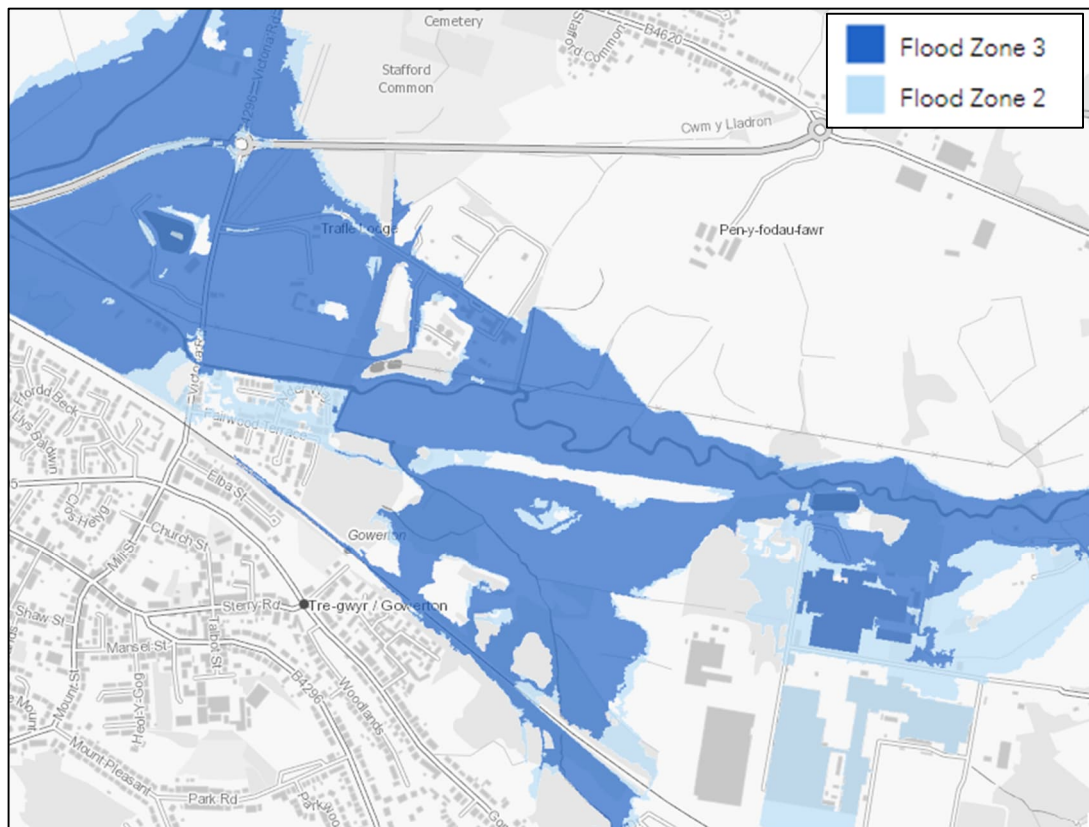


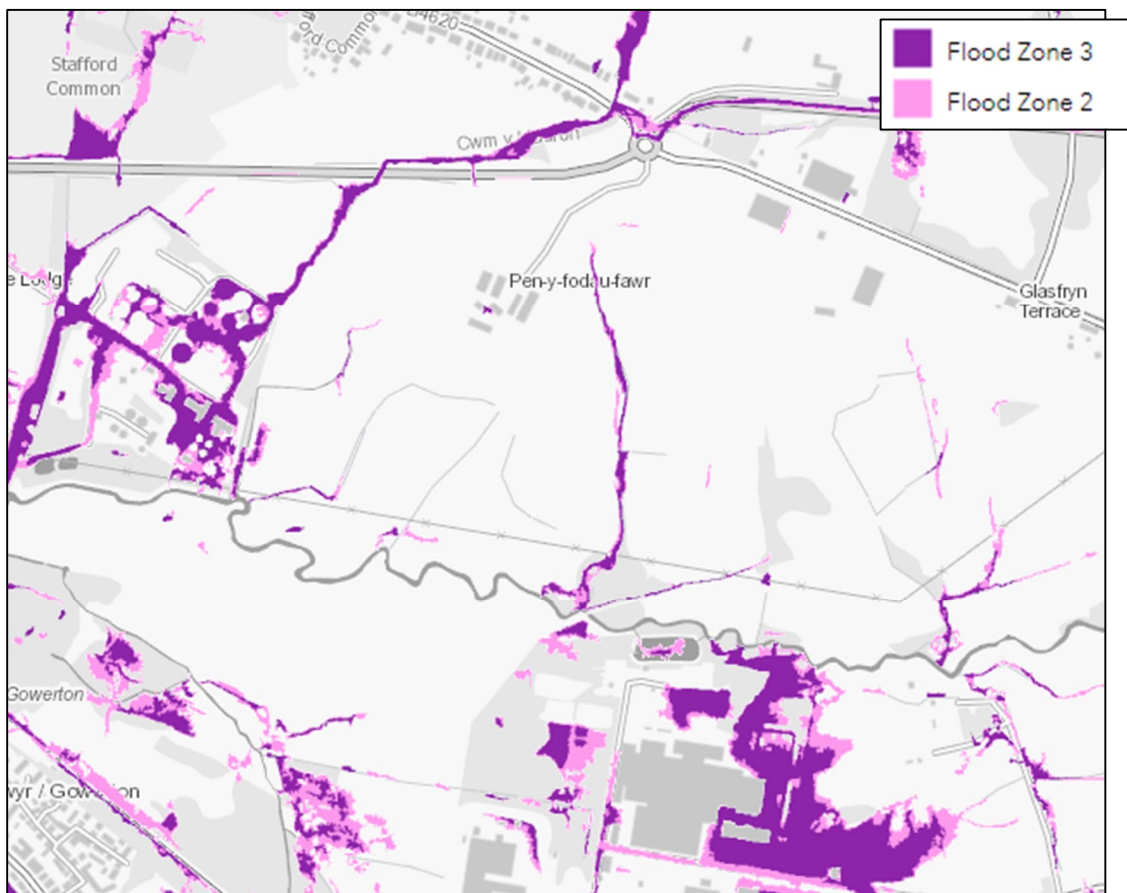
Figure 6.3 – NRW Rivers Flood Map for Planning (FMfP)



### Pluvial Flooding

6.9 The Surface Water and Small Watercourses Flood Map for Planning (Figure 6.4) indicates that the site is at low risk from surface water flooding as the majority of the site is located within Flood Zone 1 with negligible small pockets of land shown to be at high risk which would be based on existing watercourses and field ditches within the site which are proposed to be retained.

Figure 6.3 – NRW Surface Water and Small Watercourses Flood Map for Planning (FMfP)



6.10 Therefore, the development is considered to be at Very Low risk of flooding from surface water flows.

#### Groundwater Flooding

- 6.11 The underlying strata, as derived from the BGS data indicates that the site has bedrock deposits recorded as Mudstone throughout the site. The majority of the site is noted as being overlain by superficial deposits of Sand and Gravel.
- 6.12 It is therefore considered flooding from this source is Low.

#### Flooding from Sewers

- 6.13 The site will be designed with new surface water SuDS features throughout to convey surface water flows across the site and toward the existing watercourses.
- 6.14 The risk of sewer flooding to the site is therefore considered to be Very Low.

#### Flooding from Artificial Sources

- 6.15 From the NRW map there are no reservoirs or canals in the vicinity of the site.
- 6.16 Therefore, the development is considered to be at Very Low risk of flooding from reservoirs, canals and artificial sources.

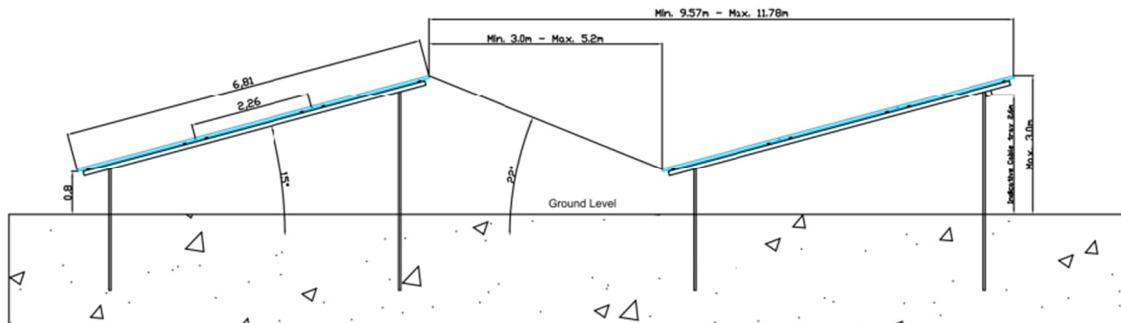
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## 7. FINISHED LEVELS AND FLOOD RESISTANCE

### Solar Panels Specification

- 7.1 The proposed solar panels mounting structure will be a 'fixed system' and will be manufactured from galvanised steel sections. The vertical supports are to be driven directly into the ground with no need for concrete foundations. The panels are mounted above the ground and so are not expected to interfere with any overland flow routes.
- 7.2 The site has proposed panels located within Flood Zone B and C2 in the south of the development within fields 20 and 21. The NRW were contacted for flood level data relevant to the site area, however no flood modelling data was available. Agreement was made to use topographical levels within Flood Zone A as a base to determine the what the flood levels would be the lowest Flood Zone A levels are 12.5m AOD.
- 7.3 The lowest levels within the site boundary where panels are placed would be approximately 10.5m AOD suggesting that the base of the panel would be set at 11.2m AOD with the flood water set partially up the panels.
- 7.4 Any electrical equipment susceptible to flood water would be placed behind the panels at the top of the array at a minimum level of 13.00m AOD, therefore sat out of the flood zone and therefore protected from any flooding event with an additional freeboard of 500mm, as shown in the PV Array Cross Section drawing and Figure 7.4 below.

Figure 7.4 – Panel Height Section



- 7.5 Any prolonged flood event would require the operator to respond to any automated alarms and engaged isolation systems which protect the operating integrity of the electrical installation (which would include submersible rated power cables) and thereafter inspect the installation and carry out necessary mechanical and electrical repairs. Any temporary cessation of power generation from the arrays impacted by a flood event would be isolated via the control boards within the relevant transformer; and not impact the power generation from the remainder of the power plant.

#### Infrastructure Specification

- 7.6 The development site will consist of transformers and the two substations to connect to overhead power cables.
- 7.7 Minor excavation and levelling will be required to prepare a support pad for the substation and transformers.
- 7.8 In line with the potential shallow and local surface water or groundwater flooding that may occur on site and with reference to standard design specifications used by electricity providers, it is recommended to raise the plinth levels to a minimum of 150mm above existing ground levels and to locate vulnerable equipment away from areas where flood risk is higher.

#### Surface Water Runoff & Impermeable Areas



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- 7.9 The development will only marginally increase the percentage impermeable surface area.
- 7.10 Consequently, the run-off from the post-development site would remain almost exactly as the existing land use. It is therefore proposed to allow the development to drain to the soil surface, where infiltration to the underlying soils would occur, to mimic the existing hydrological characteristics of the site.
- 7.11 It is important that development does not increase run-off from the site and thereby increase the risks of flooding for others. There may be risks associated with soil compaction or degradation during construction or brought about by the rain-shadows under the arrays.
- 7.12 However, many such risks also exist with modern farming practices. It is therefore recommended that following installation of the panels the site is chisel-ploughed or similarly cultivated and seeded with native meadow grass and wildflowers. Chisel-ploughing will reduce soil compaction on the site and promote seed growth; it has been proven to significantly increase infiltration thereby reducing runoff rates from the site. Additionally, longer meadow type grasses and wildflower vegetation provide high levels of natural storage which will serve to reduce the risks of erosion and limit surface water flows across the site. With the implementation of Chisel-ploughing, changing the site's primary function to solar power generation will have several potential longer-term benefits regarding surface water runoff rates. Further information can be found in the Ecological Appraisal by Devon Wildlife Consultants.
- 7.13 The absence of intensive farming activity will provide the following benefits which serve to reduce soil compaction and runoff rates from the site:
- The field will not be left without vegetation coverage in the winter (if in arable production);
  - The field will not be intensively trodden or over grazed; and
  - The field will not be regularly traversed by heavy machinery.

- 7.14 Using the site for solar power generation therefore has the potential to provide betterment to the existing land use in terms of surface water runoff rates and downstream flood risk.

Access & Egress

- 7.15 The nature of the site is that it would be unmanned for large periods of time with occupation only coming in the form of maintenance. Therefore, access to and from the development can be assessed upon arrival to the site, access tracks lead from within each parcel to the highest point should it be needed.

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## 8. SURFACE WATER ENHANCEMENT FEATURES

8.1 The majority of the site is within Flood zone A, as previously stated. However, areas to the south are shown within Flood zone B and Flood zone C2.

8.2 It is proposed to provide a series of enhancements such as swales, basins, check dams and filter trenches along arrays rows that will be provided to aid in the slowing down of flood waters as part of a SuDS type train which will allow the flows of water to be contained and slow the flows of waters across these areas when flooding occurs during extreme events. Notably the extra hedgerows and the Rhos grassland field provide betterment once the cattle poaching has stopped, and the meadow grasses recover. Additionally, proposed tree planting is purposefully laid out to also reduce flows into Afon Llan.

8.3 This will provide a betterment in overall flood risk to the site but also impact on the fast rate of connection to the existing watercourses.

8.4 The above has been provided for information purposes to assist the description of the proposed development within this FCA.

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## 9. SUMMARY

- 9.1 The site is comprised of grassed areas, trees and other vegetation. The BGS records show the bedrock geology is mudstone, siltstone and sandstone. The Soilscape mapping shows the site to be in an area of impeded drainage.
- 9.2 The development prioritises conforming with the designations for the landscape and nature conservation areas of green infrastructure and wildlife habitat improvements across the fields.
- 9.3 Land within the solar array areas will be available for continued agricultural use for the duration of the development as the fields will be capable of being grazed by sheep.
- 9.4 The development has a life of at least 40 years, after which the modules would be decommissioned and removed from the site and the site returned to agricultural use.
- 9.5 Infiltration may only be possible across the upper slopes given the underlying strata at the site. Therefore, it is considered a series of SuDS features will be provided throughout the site to drain surface water run-off. The ecological proposals would further add to the water storage retention capacity of the proposed SuDS features.
- 9.6 The development will not add any significant areas of impermeable surfacing. Surface water runoff will drain partially to ground, as existing, and overland flows collected via new swale systems to slow run-off and improve water quality.
- 9.7 A series of flood compensation and enhancement features are proposed across the entire site to assist in slowing run-off from the fields and providing storage during extreme flood events.
- 9.8 The development sits within Flood Zones A (1), B (2) and C2 (3), with the southern portion of the site sitting predominately within Flood Zone C2. The site is at low risk from all other causes of flooding reviewed. The renewable power from these arrays together may directly or indirectly energise the neighbouring industrial facilities.

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- 9.9 The flood levels have been discussed with the NRW who have confirmed no data is available, panel base height will be set at 13.00m AOD as a minimum within the Flood Zone affected areas. Electrical wiring will be set above this level at the high point of the solar panel array.
- 9.10 The development, consisting of solar panels, batteries and inverters will generate minimal impermeable area which will be contained at source by gravel surrounding areas.
- 9.11 Separate SAB approval will be required for the site drainage proposals aside from any planning application, this will be obtained after the DNS process.
- 9.12 As summarised in Section 4, the development can be considered appropriate within the considerations of TAN 15 as the development is shown to be predominantly in Flood Zone A with smaller portions shown to be in Flood Zone B and C. The development is justified by meeting the relevant requirements set out within the TAN15 justification test and complies with Future Wales policies 18 criteria, and thus also Policy 17 and is therefore deemed appropriate in this location.

## Appendix A – Topographical Survey

NOT TO SCALE



- Bottom of Bank ————
- Bottom of Kerb ————
- Bridge ————
- Building ————
- Concrete Column
- Concrete Pole
- Conductor Lines ————
- Contours-Normal ————
- Contours-Prominent ————
- Edge of Concrete ————
- Edge of Road ————
- Edge of Tarmac ————
- Edge of Track ————
- Electric Box ————
- Electricity Pole
- Fence Chain and Link ————
- Fence Post and Board ————
- Fence Post and Panel ————
- Fence Post and Wire ————
- Gate ————
- Gate opening ————
- Gully ————
- Hedge ————
- Inspection Cover ————
- Lamp Post
- Metal Fence ————
- Pylon
- Security Fence ————
- Sign
- Spot Level
- Stay ————
- Top of Bank ————
- Top of Kerb ————
- Tree
- Tree Canopy ————
- Wall ————

Notes:

Survey related to "OS Net" using real time correction with Trimble VRS Now.

Levels related to GPS Orthometric height, converted to MSL (Newlyn) by OSGM02.

Every effort has been made to identify all visible above ground features. However, bare in mind that at the time of survey, some features may have been obscured.

Treat levels in dense vegetation with caution. Treat levels in water with caution.

Visible features detailed on the survey may not represent the legal ownership boundaries.

Rev. Suffix	Date	Details
-------------	------	---------

SITE

Gowerton  
Swansea  
SA4 4LN

TITLE

Topographical Survey  
With  
500mm Contour intervals  
and 15m Spot levels

DWG. No. GO/TPS/HV/002	REV
---------------------------	-----

SCALE 1: 3000	DATE 16/12/2021
------------------	--------------------

DRAWN H. Vaughan	STATUS Draft
---------------------	-----------------

**Mining Surveys  
(UK) Ltd**

Land Surveying, Measured Building Surveys, Hydrographic Surveys  
3D Visualisation, Planning, Design and Evaluation

1, The Bridge Business Centre, Boreford Way, Dunston, Cheshire, Cheshire, Cheshire, Cheshire SA1 9FG  
Tel 01246 268444 / 07798 841346 / 07798 841344 Fax 01246 268129

## Appendix B - Proposed Site Layout





On behalf of:



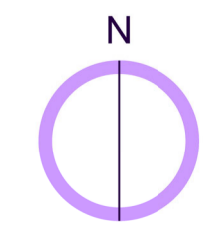
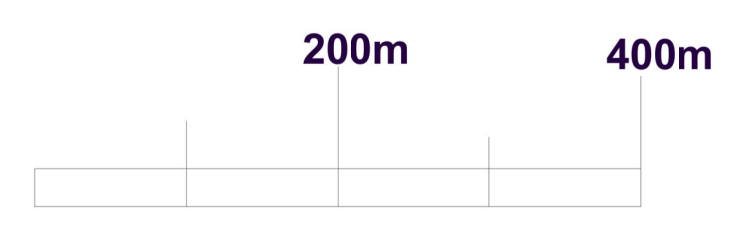
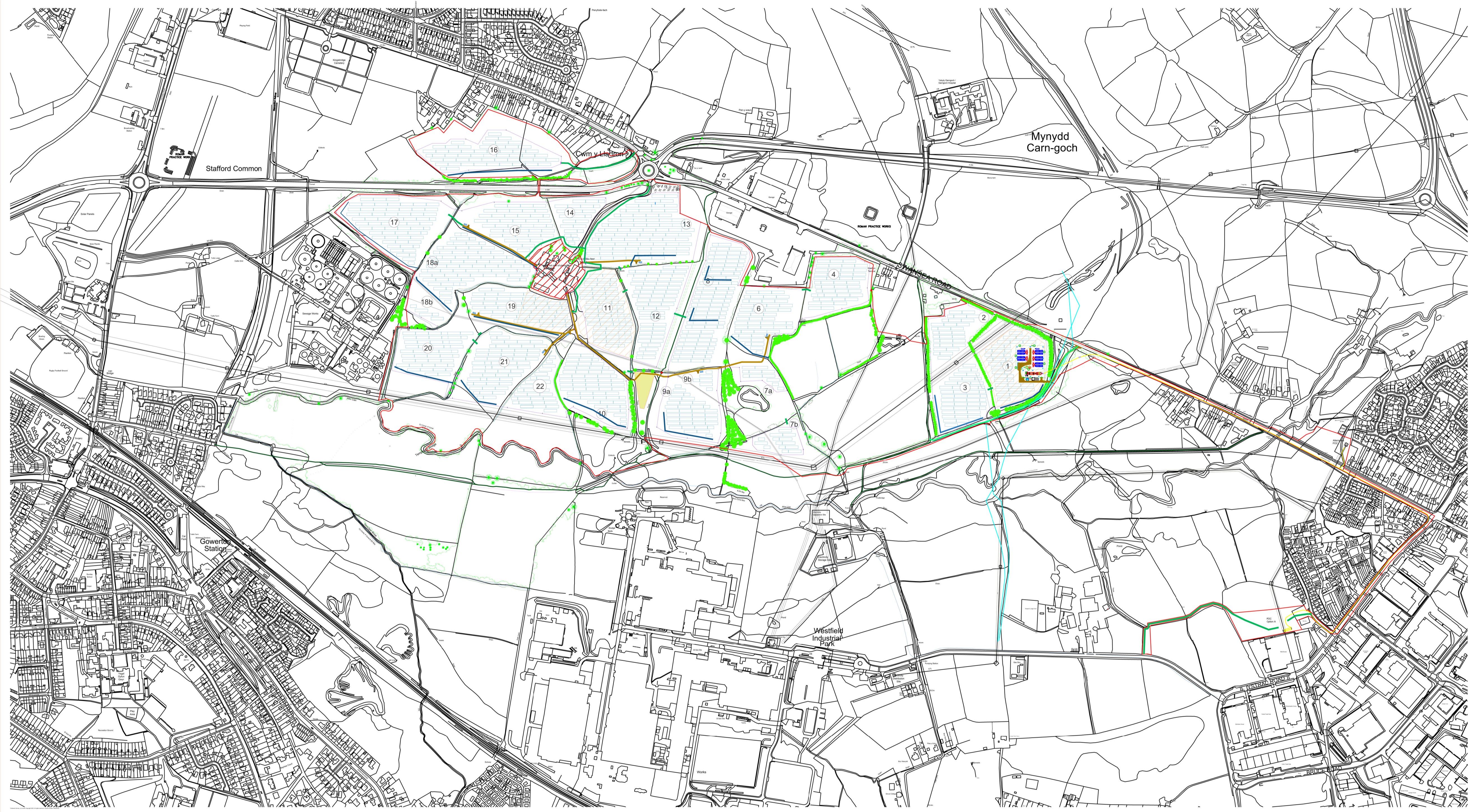
Notes  
 Key:

Existing Assets

- Public Right of Way
- Gas Line
- Hedges & Trees

Proposed Assets:

- Planning Application Boundary
- Swale
- Fence
- Cable Route with Jointing Pits
- Gates
- Solar Array
- Transformer
- Site Road Permanent
- CCTV
- Temporary Construction
- Track
- Construction Compound
- No Crossing
- BESS Transformer
- BESS Battery unit
- Field Number
- Permissive Footpath



DRWN	CKD	APP	REV	DESCRIPTION
Drawn By	Checked By	<b>REV</b>		
MSTP	GR			
Date	Approved By	V13		
01.12.2023	CD			
<b>PROJECT</b>	<b>Parc Solar Caenewydd</b>			
<b>TITLE</b>	Proposed Layout Plan			
<b>CLIENT</b>	<b>Taiyo Power and Storage</b>			
<b>STATUS</b>	Planning Application			
Sheet No	Sheet Title	Sheet Size		
1		A1		
Scale:	Drawing Number			
1:5000	PSC 100 001			