Ely Valley Solar Farm, land to North of Ynysmaerdy, Llantrisant, CF72 8LN

Flood Consequence Assessment and Drainage Strategy

For Windel Solar 8 Ltd

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June 2025

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Ely Valley Solar Farm

Project	Flood Consequence Assessment and Drainage Strategy
Client	Windel Solar 8 Ltd
Status	Final
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EXECUTIVE SUMMARY

The Site would be expected to remain dry in all but the most extreme conditions. The consequences of flooding are acceptable, and the development would be in accordance with the requirements of Technical Advice Note 15 (TAN15). The Proposed Development would be operated with minimal risk from flooding, would not increase flood risk elsewhere and is compliant with the requirements of TAN15. The Proposed Development will considerably reduce the flood risk posed to the Site and to offsite locations due to the adoption of a Drainage Strategy.

The Proposed Development should not therefore be precluded on the grounds of flood risk or drainage.

1.0 INTRODUCTION

1.1 Background

This Flood Consequence Assessment and Drainage Strategy (FCA) has been prepared by KRS Enviro at the request of Windel Solar 8 Ltd to support a planning application for the development of a solar farm ("the Proposed Development") on land to north of Ynysmaerdy, Llantristant, CF72 8LN ("the Site").

This FCA has been carried out in accordance with guidance contained in the Technical Advice Note 15 Development and Flood Risk (TAN15) and associated Flood Map for Planning (FMfP). This FCA identifies and assesses the risks of all forms of flooding to and from the development and demonstrates how these flood risks will be managed so that the development remains safe throughout the lifetime, taking climate change into account.

It is recognised that developments which are designed without regard to flood risk may endanger lives, damage property, cause disruption to the wider community, damage the environment, be difficult to insure and require additional expense on remedial works. The development design should be such that future users will not have difficulty obtaining insurance or mortgage finance, or in selling all or part of the development, as a result of flood risk issues.

1.2 Technical Advice Note 15 (TAN15)

One of the key aims of TAN15 is to ensure that flood risk is taken into account at all stages of the planning process; to avoid inappropriate development in areas at risk of flooding and to direct development away from areas of highest risk.

It advises that where new development is exceptionally necessary in areas of higher risk, this should be safe, without increasing flood risk elsewhere, and where possible, reduce flood risk overall. A risk-based approach is adopted at stages of the planning process, applying a source pathway receptor model to planning and flood risk. To demonstrate this, an FCA is required and should include:

- whether a proposed development is likely to be affected by current or future flooding from all sources;
- whether it will increase flood risk elsewhere;
- whether the measures proposed to deal with these effects and risks are appropriate; and
- satisfy the justification test, including the acceptability of consequences.

A revised TAN15 has recently been implemented. This is supported by the new FMfP, which includes climate change information to show how this will affect flood risk extents over the next century. It shows the potential extent of flooding assuming no defences are in place.

1.3 Report Structure

This FCA has the following report structure:

- Section 2 describes the location and the existing and Proposed Development;
- Section 3 outlines the flood risk to the existing and Proposed Development;

- Section 4 outlines the Drainage Strategy for the Site;
- Section 5 justifies the location of the development in term of TAN15; and
- Section 6 presents a summary and conclusions.

2.0 LOCATION & DEVELOPMENT DESCRIPTION

2.1 Site Location

The Site is located on land to north of Ynysmaerdy, Llantrisant, CF72 8LN (see Figure 1). The National Grid Reference (NGR) of the Site is 303111, 185108.

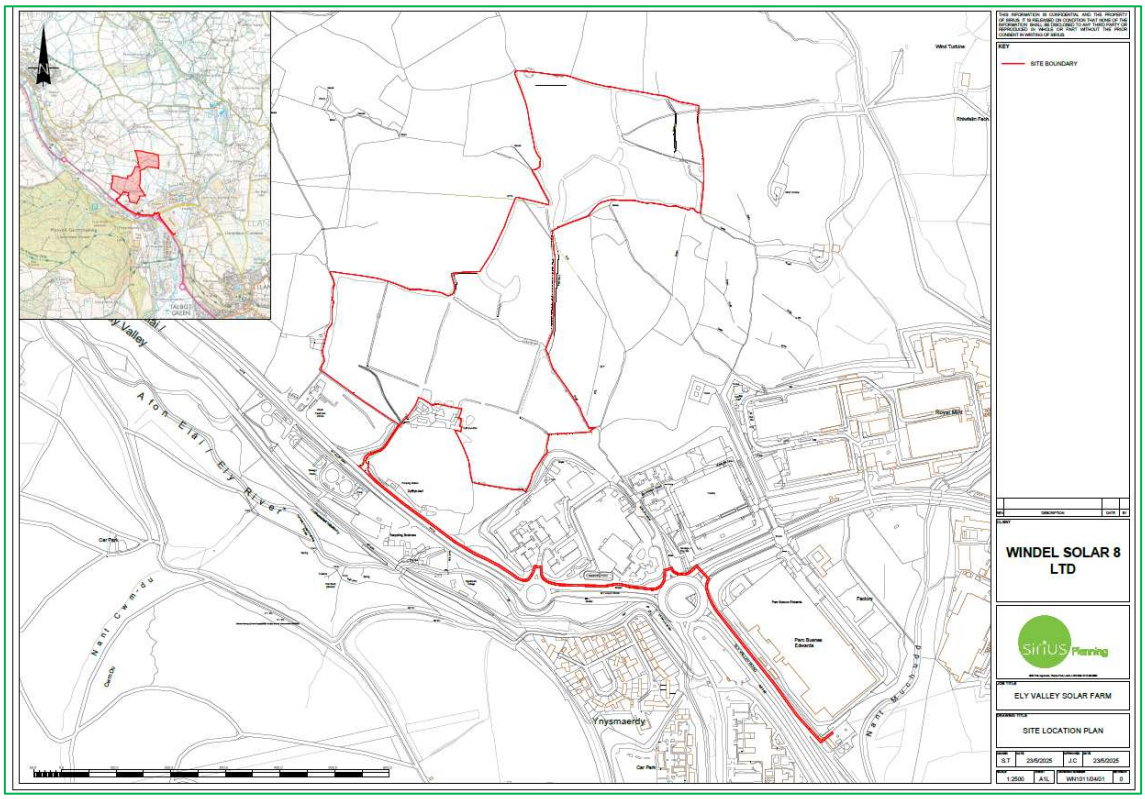

Figure 1 - Site Location

2.2 Existing Development

The existing Site is currently grazing land.

2.3 Proposed Development

The Proposed Development is for a solar farm and associated infrastructure (see Appendix 2). Further details with regard to the Proposed Development can be found in the accompanying information submitted with the planning application.

2.4 Ground Levels

The Site slopes from north to south with approximate ground levels of 150 metres Above Ordnance Datum (mAOD) decreasing to 75mAOD along the southern boundary.

2.5 Catchment Hydrology/Drainage

The River Ely is located approximately 140m to the south west of the Site. There are various drainage ditches located within the vicinity of the Site. The Site is located within an area of moderate rainfall. The 1961-1990 Standard Average Annual Rainfall (SAAR) for the Site as

recorded in the FEH Webservice is 756 mm per annum. The UK national average is 832mm per annum.

2.6 Ground Conditions

The British Geological Survey (BGS) map shows that the bedrock deposits consist of Hughes Member - mudstone, siltstone and sandstone. Sedimentary bedrock formed approximately 308 to 310 million years ago in the Carboniferous Period in a local environment previously dominated by rivers. Superficial deposits consist of Till, Devensian - diamicton. Superficial deposits formed up to 2 million years ago in the Quaternary Period in a local environment previously dominated by ice age conditions.

Information from the National Soil Resources Institute details the Site area as being situated on slowly permeable wet very acid upland soils with a peaty surface. The Wallingford Winter Rain Acceptance Potential (WRAP) map indicates that the Site lies within WRAP Class 3: i) Relatively impermeable soils in boulder and sedimentary clays, and in alluvium, especially in eastern England; ii) Permeable soils with shallow ground water in low-lying areas; iii) Mixed areas of permeable and impermeable soils, in approximately equal proportions.

2.7 Source Protection Zone

The Site is not located within a Source Protection Zone (SPZ). SPZ's (merged) have been defined by Natural Resources Wales around major public water supplies with the intent to show the risk of contamination from any activities that might cause pollution in the area.

3.0 FLOOD RISK

3.1 Sources of Flooding

All sources of flooding have been considered, these are; fluvial (river) flooding, tidal (coastal) flooding, groundwater flooding, surface water (pluvial) flooding, sewer flooding and flooding from artificial drainage systems/infrastructure failure.

3.2 Natural Resources Wales

Information regarding the current flood risk at the application Site, local flood defences and flood risk has been obtained from Natural Resources Wales, which is the most up to date at the time of this FCA.

3.3 Rhondda Cynon Taf County Borough Council

Rhondda Cynon Taf County Borough Council is the Local Panning Authority (LPA) and the Lead Local Flood Authority (LLFA) and has responsibilities for 'local flood risk', which includes surface runoff, groundwater and ordinary watercourses. Planning guidance written by Rhondda Cynon Taf County Borough Council regarding flood risk was consulted to assess the mitigation policies in place. In particular, the Rhondda Cynon Taf County Borough Council Strategic Flood Consequence Assessment (SFCA) has been reviewed.

3.4 Climate Change

Projections of future climate change, in the UK, indicate more frequent, short-duration, high intensity rainfall and more frequent periods of long duration rainfall. Guidance included within TAN15 recommends that the effects of climate change are incorporated into FCA. Recommended precautionary sensitivity ranges for peak rainfall intensities, peak river flows and sea level rise are outlined in the following documents CL-03-16 - Climate Change Allowances for Planning Purposes , Flood Consequence Assessments: Climate change allowances and Adapting to Climate Change: Guidance for Flood and Coastal Erosion Risk Management Authorities in Wales .

The 9th of January 2014 Welsh Government letter to all Chief Planning Officers (CPO) in Wales and CL-03-16 - Climate Change Allowances for Planning Purposes clarifies and refers to the Natural Resources Wales recommendations that the lifetime of development for residential development is 100 years, and for other development it is considered to be 75 years. Table 1 show the peak river flow allowances by river catchment.

Table 1 - Peak River Flow Allowances by River Basin District

Catchment	Allowance Category	2020s	2050s	2080s
Severn	Upper	25%	40%	70%
	Central	10%	20%	25%

3.5 Historic Flooding

The Natural Resources Wales historic flood map shows that the Site has not historically flooded (see Figure 2). The British Hydrological Society "Chronology of British Hydrological Events[1]" has no information on flooding within the vicinity of the Site. No other historical records of

[1] http://www.dundee.ac.uk/geography/cbhe/

flooding for the Site have been recorded. Therefore, it has been assumed that the Site has not historically flooded in the recent past.

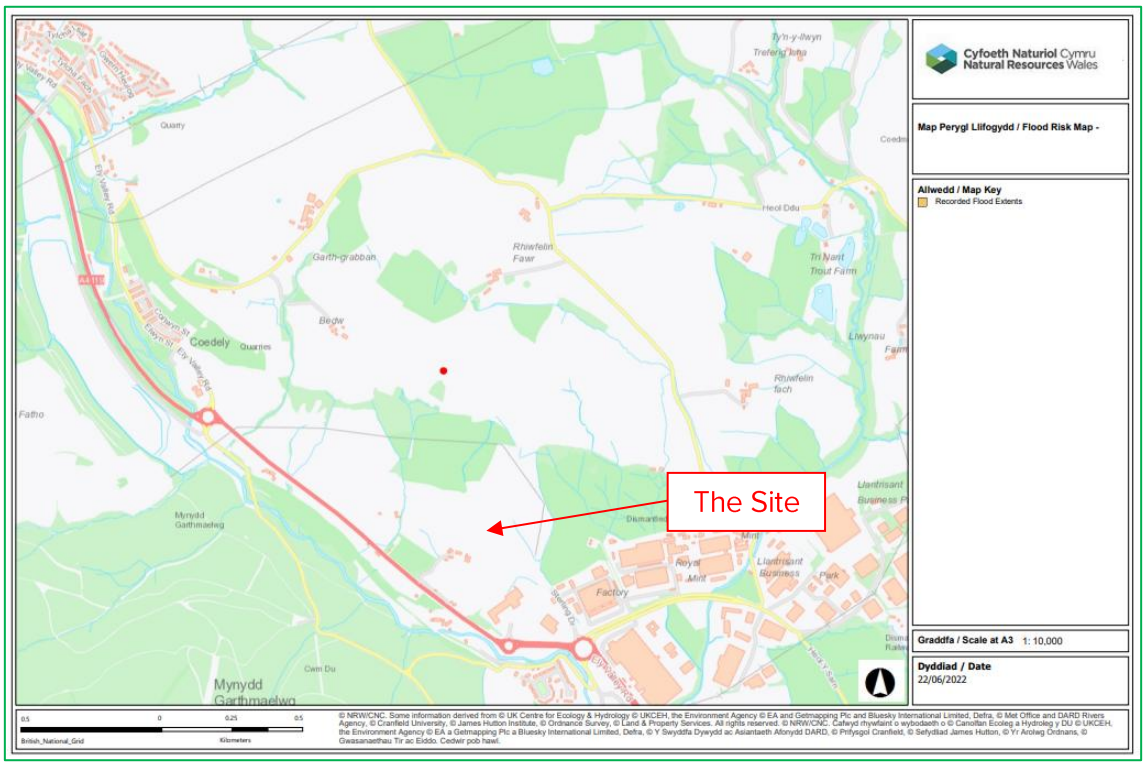

Figure 2 - Natural Resources Wales Historic Flood Map

3.6 Existing and Planned Flood Defence Measures

The site is not protected against flooding by existing flood defence measures.

3.7 Flood Map for Planning

The FMfP represents the best available information on flood risk. The FMfP shows that the main Site is located within the following flood zones:

- Rivers: Flood Zone 1 with less than a 1 in 1000 (0.1%) years chance of flooding from rivers and the sea in a given year, including the effects of climate change (see Figure 3).
- Sea: Flood Zone 1 with less than a 1 in 1000 (0.1%) years chance of flooding from rivers and the sea in a given year, including the effects of climate change (see Figure 3).
- Surface water and small watercourses: The majority of the Site is located within Flood Zone 1 however, there is a small proportion of the Site which is located within Flood Zones 2 and 3 with a 1 in 1000 to 1 in 100 (0.1% to 1%) to more than 1 in 100 (1%) chance of flooding in a given year, including the effects of climate change (see Figure 4).

The cable route to the south east of the main Site is located within the following flood zones:

- Rivers: The majority of the cable route is located within Flood Zone 1 with less than a 1 in 1000 (0.1%) years chance of flooding from rivers and the sea in a given year, including the effects of climate change however, there is a small proportion of the cable which is located within Flood Zone 2 with between 0.1% to 1% (1 in 1000 to 1 in 100) chance of

flooding from rivers in a given year, including the effects of climate change (se Figure 3).

- Sea: Flood Zone 1 with less than a 1 in 1000 (0.1%) years chance of flooding from rivers and the sea in a given year, including the effects of climate change (see Figure 3).

- Surface water and small watercourses: The majority of the cable route is located within Flood Zone 1 however, there is a small proportion of the cable route directly south of the main Site which is located within Flood Zone 3 with a more than 1 in 100 (1%) chance of flooding in a given year, including the effects of climate change (see Figure 4).

Table 2 provides details of the FMfP Flood Zones. The Proposed Development is deemed appropriate for this location.

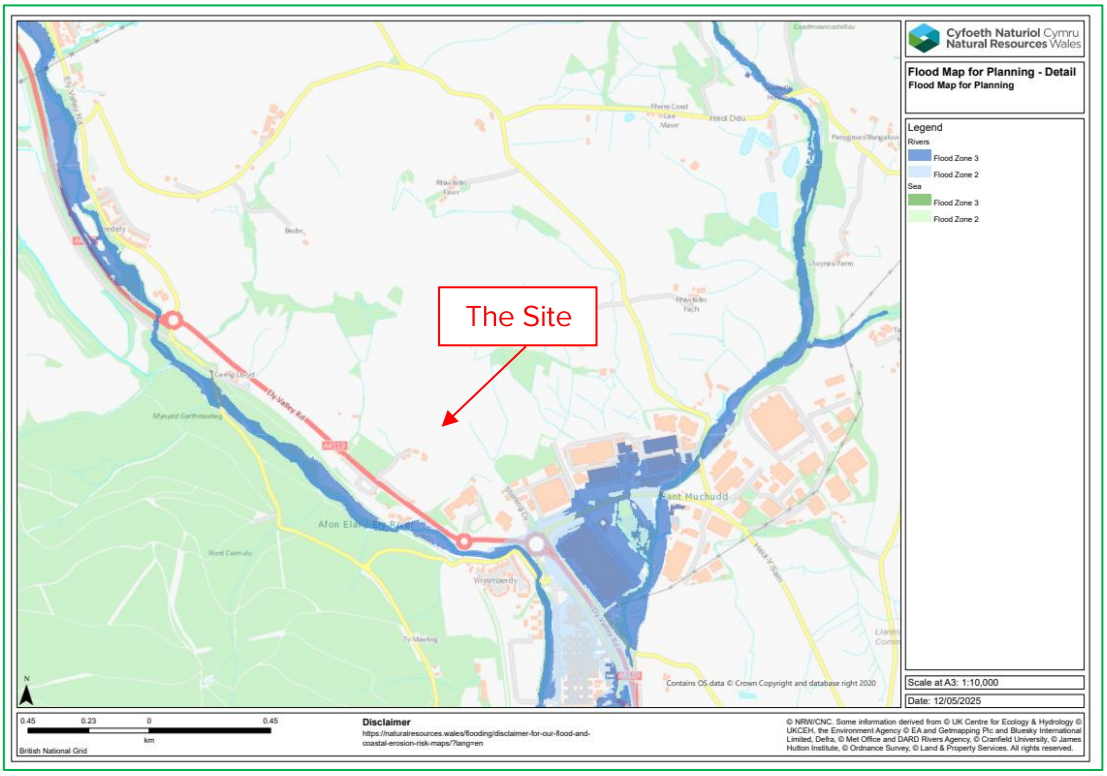

Figure 3 - Flood Map for Planning: Rivers and Seas

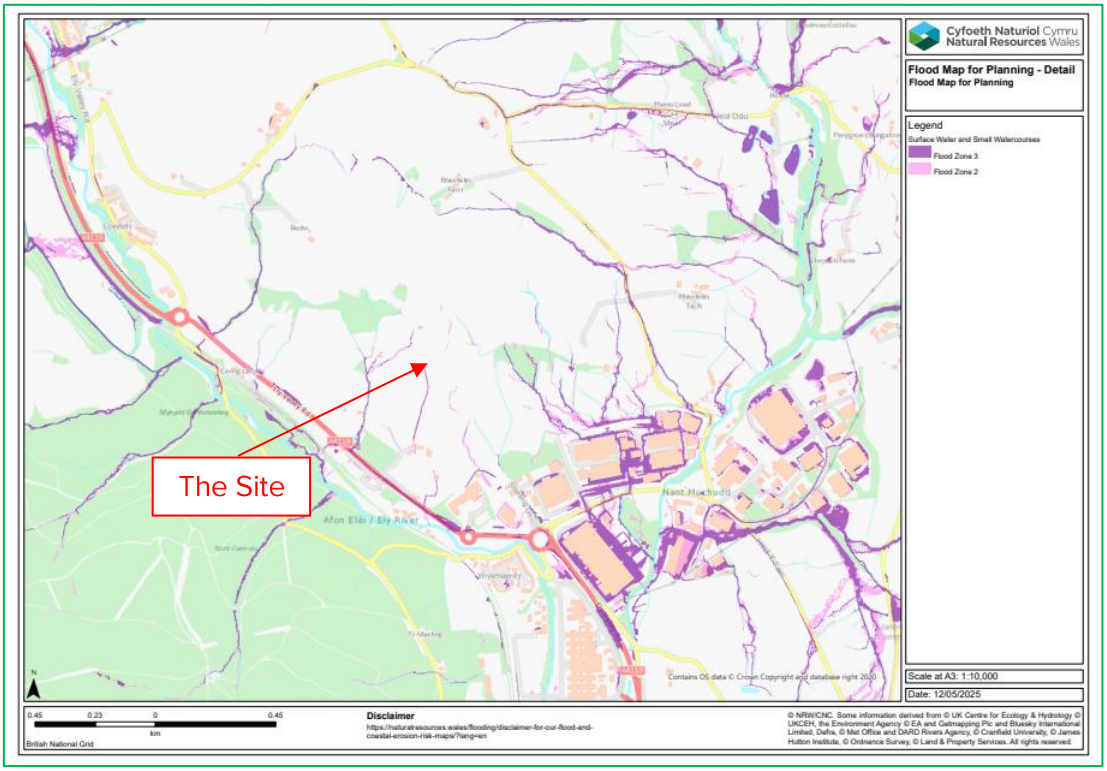

Figure 4 - Flood Map for Planning: Surface Water and Small Watercourses

Table 2 - Flood Map for Planning Flood Zones

Flood Zone	Explanation
Rivers - Flood Zone 2	Areas with 0.1% to 1% (1 in 1000 to 1 in 100) chance of flooding from rivers in a given year, including the effects of climate change.
Rivers - Flood Zone 3	Areas with more than 1% (1 in 100) chance of flooding from rivers in a given year, including the effects of climate change.
Sea - Flood Zone 2	Areas with 0.1% to 0.5% (1 in 1000 to 1 in 200) chance of flooding from the sea in a given year, including the effects of climate change.
Sea - Flood Zone 3	Areas with more than 0.5% (1 in 200) chance of flooding from the sea in a given year, including the effects of climate change.
Surface Water and Small Watercourses - Flood Zone 2	Areas with 0.1% to 1% (1 in 1000 to 1 in 100) chance of flooding from surface water and/or small watercourses in a given year, including the effects of climate change.
Surface Water and Small Watercourses - Flood Zone 3	Areas with more than 1% (1 in 100) chance of flooding from surface water and/or small watercourses in a given year, including the effects of climate change.

3.8 Flood Vulnerability

Applying the Flood Risk Vulnerability Classification in TAN15, the proposed use of the Site is 'less vulnerable'. The Proposed Development is deemed appropriate for this location.

3.9 Fluvial (River) Flooding

Fluvial flooding from the River Ely poses the primary flood risk to the Site. The FMfP shows that the main Site is located within Flood Zone 1 with less than a 1 in 1000 (0.1%) years chance of

flooding from rivers and the sea in a given year, including the effects of climate change (see Figure 3).

The FMfP shows that the majority of the cable route is located within Flood Zone 1 with less than a 1 in 1000 (0.1%) years chance of flooding from rivers and the sea in a given year, including the effects of climate change however, there is a small proportion of the cable which is located within Flood Zone 2 with between 0.1% to 1% (1 in 1000 to 1 in 100) chance of flooding from rivers in a given year, including the effects of climate change (se Figure 3).

However, the cable route will be located underground within the existing carriageway of the road and will therefore not be vulnerable to flooding. Given the scale and nature of the Proposed Development and the size and location of the fluvial flooding sources it has been concluded that fluvial flooding poses a low flood risk to the Site and the risk of fluvial flooding is considered to be of low significance.

3.10 Tidal (Coastal) Flooding

The Site is not located within the vicinity of tidal flooding sources and the risk of tidal flooding is considered to be not significant.

3.11 Groundwater Flooding

Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

Groundwater flooding tends to occur sporadically in both location and time. When groundwater flooding does occur, it tends to mostly affect low-lying areas, below surface infrastructure and buildings (for example, tunnels, basements and car parks) underlain by permeable rocks (aquifers). Site ground conditions suggest a low potential for groundwater flooding. The risk of flooding from groundwater flooding is considered to be not significant.

3.12 Surface Water (Pluvial) Flooding

The Site is not situated near to large areas of poor permeability which may result in surface water flooding. The FMfP shows that the majority of the Site is located within Flood Zone 1 with less than a 1 in 1000 (0.1%) years chance of flooding from surface water and/or small watercourses in a given year, including the effects of climate change.

However, there is a small proportion of the main Site and a section of the cable route which is located within Flood Zones 2 and 3 with a 1 in 1000 to 1 in 100 (0.1% to 1%) to more than 1 in 100 (1%) chance of flooding in a given year, including the effects of climate change (see Figure 4). These areas are associated with the land immediately adjacent to the drainage ditches and low spots and would only impact a very small proportion of the Site.

Given the scale and nature of the Proposed Development and the size and location of the surface water flooding sources it has been concluded that surface water flooding poses a low flood risk to the Site and the risk of surface water flooding is considered to be of low significance.

3.13 Sewer Flooding

Sewer flooding occurs when urban drainage networks become overwhelmed and maximum capacity is reached. This can occur if there is a blockage in the network causing water to back up behind it or if the sheer volume of water draining into the system is too great to be handled.

Sewer flooding tends to occur sporadically in both location and time such flood flows would tend to be confined to the streets around the development.

Any sewers will inevitably have a limited capacity so in extreme conditions there would be surcharges, which may in turn cause flooding. Flood flows could also be generated by burst water mains, but these would tend to be of a restricted and much lower volume than weather generated events and so can be discounted for the purposes of this assessment.

Given the design parameters normally used for drainage design in recent times and allowing for some deterioration in the performance of the installed systems, which are likely to have been in place for many years, an appropriate flood risk probability from this source could be assumed to have a return period in the order of 1 in 10 to 1 in 20 years. The provision of adequate level difference between the ground floors and adjacent ground level would reduce the annual probability of damage to property from this source to 1 in 100 years or less. The risk of flooding from sewer flooding is considered to be not significant.

3.14 Flooding from Artificial Drainage Systems/Infrastructure Failure

There are no nearby artificial water bodies, water channels, reservoirs and artificial drainage systems that could be considered a flood risk to the Site. The Natural Resources Wales Reservoir flood map shows that the Site is not at risk of reservoir flooding (see Figure 5). The risk of flooding from artificial drainage systems/infrastructure failure is considered to be not significant.

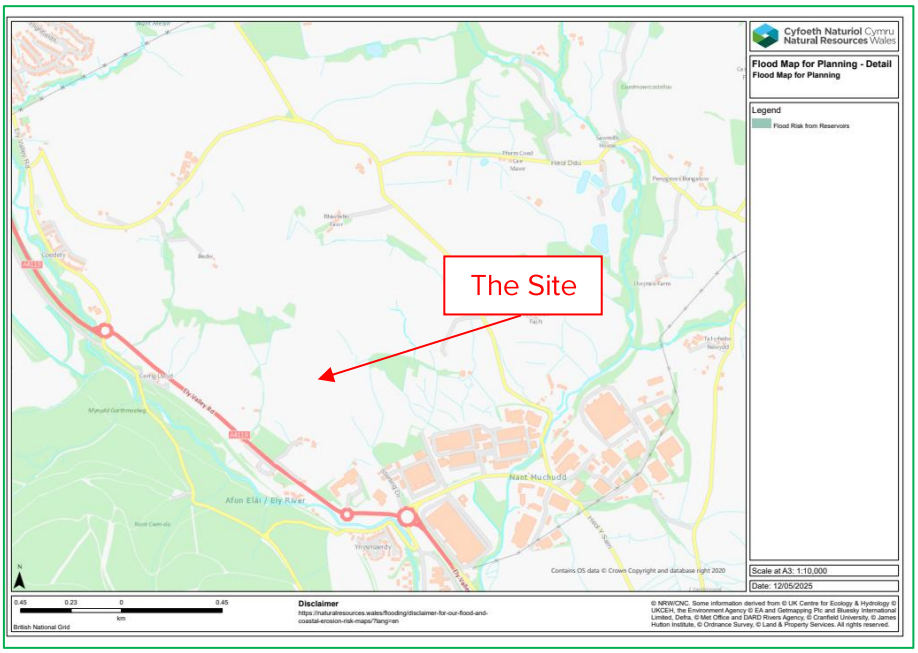

Figure 5 - Natural Resources Wales Reservoir Flood Map

3.15 The Effect of the Development on Flood Risk

The Proposed Development will have no impact on flood risk and the overall direction of the movement of water will be maintained within the developed Site and surrounding area. There will be no net loss in flood storage capacity. The conveyance routes (flow paths) will not be blocked or obstructed. The topography of the Site will not be altered; therefore, the overland flow routes will not be altered.

3.16 Summary of Site Specific Flood Risk

A summary of the sources of flooding and a review of the risk posed by each source at the Site is shown in Table 3.

The main Site is not at risk of flooding from a major source (e.g. fluvial and/or tidal) and is located within FMfP Flood Zone 1, with less than a 1 in 1000 (0.1%) annual probability of flooding from rivers in a given year, including the effects of climate change. A section of the cable route is located within FMfP Flood Zone 2 with between 0.1% to 1% (1 in 1000 to 1 in 100) chance of flooding from rivers in a given year, including the effects of climate change.

However, the cable route will be located underground within the existing carriageway of the road and will therefore not be vulnerable to flooding. Given the scale and nature of the Proposed Development and the size and location of the fluvial flooding sources it has been concluded that fluvial flooding poses a low flood risk to the Site and the risk of fluvial flooding is considered to be of low significance.

A secondary flooding source has been identified which may pose a low significant risk to the Site. This is:

- Surface Water Flooding

The flood risk is associated with the land immediately adjacent to the drainage ditches and low spots and would only impact a very small proportion of the Site. The Proposed Development is classified as 'less vulnerable', 'less vulnerable' uses are deemed appropriate for this location.

There will be no net loss in flood storage capacity or impact on movement of floodwater across the Site. The overall direction of the movement of water will be maintained within the developed Site and surrounding area. The conveyance routes (flow paths) will not be blocked or obstructed.

In conclusion, the flood risk to the Site can be considered to be very limited and the Proposed Development is deemed appropriate for this location.

Table 3 - Risk Posed by Flooding Sources

Sources of Flooding	Potential Flood Risk	Potential Source	Probability/Significance
Fluvial Flooding	Yes	River Ely	Low
Tidal Flooding	No	None Reported	None
Groundwater Flooding	No	None Reported	None
Surface Water Flooding	Yes	Low Spots	Low
Sewer Flooding	No	None Reported	None
Flooding from Artificial Drainage Systems/Infrastructure Failure	No	None Reported	None

4.0 DRAINAGE STRATEGY

4.1 Surface Water Management Overview

It is recognised that consideration of flood issues should not be confined to the floodplain. The alteration of natural surface water flow patterns through developments can lead to problems elsewhere in the catchment, particularly flooding downstream. For example, replacing vegetated areas with roofs, roads and other paved areas can increase both the total and the peak flow of surface water runoff from the Site. Changes of land use on previously developed land can also have significant downstream impacts where the existing drainage system may not have sufficient capacity for the additional drainage.

An assessment of the surface water runoff rates has been undertaken, in order to determine the surface water options and attenuation requirements for the Site. The assessment considers the impact of the proposals compared to current conditions. Therefore, the surface water attenuation requirement for the developed Site can be determined and reviewed against existing arrangements.

The requirement for managing surface water runoff from developments depends on the pre-developed nature of the Site. If it is an undeveloped Greenfield site, then the impact of the proposals will need to be mitigated so that the runoff from the Site replicates the natural drainage characteristics of the pre-developed Site. The surface water drainage arrangements for any site should be such that the volumes and peak flow rates of surface water leaving a site are no greater than the rates prior to the Proposed Development unless specific off-site arrangements are made and result in the same net effect.

It should be acknowledged that the satisfactory collection, control and discharge of surface water runoff are now a principle planning and design consideration. This is reflected in recently implemented guidance and the National Sustainable Drainage Systems (SuDS) Standards. It is necessary to demonstrate that the surface water from the proposals can be discharged safety and sustainably.

4.2 Surface Water Runoff Rate/Volume

The proposed PV modules will consist of an aluminium frame, with stainless steel supports and/or concrete shoes in sensitive areas. Greenfield conditions will be retained as alluded to in the BRE Planning Guidance for the Development of Large Scale Ground Mounted Solar PV Systems[2]. Although the solar panels will divert the downward path of falling rain, being raised off the ground on frames, they will not reduce the permeable area where they are sited. Any rainfall that does fall onto the Site will, as now, infiltrates into the soil substrate. The flow path over the PV modules is shown in Figure 6.

It is anticipated that rain falling on each of the solar PV modules will fall underneath the downslope of the panels. A gap of approximately 20mm will allow water to drain off each PV module (the 20mm gap surrounds all sides of the panels) (see Figure 7). Tussock grasses will dominate around and beneath the photovoltaic panels to limit soil erosion caused by runoff from the panels.

The erection of the solar panels will require the use of light machinery. Care will be taken during the construction to limit the cultivation and disturbance of the ground by plant movement and exposure of soil. However, it is anticipated that this would not lead to irreversible

[2] BRE (2013) Planning Guidance for the development of large-scale ground mounted solar PV systems: https://www.bre.co.uk/filelibrary/pdf/other_pdfs/KN5524_Planning_Guidance_reduced.pdf

compaction of soils on the Site. However, no work will be undertaken until a perimeter wide cross-contour vegetated swale is constructed around the downstream boundary of the Site which will be along the southern boundaries of the Site. Therefore, infiltration should not be limited by compaction of soils swales are constructed to intercept flows and will limit the impacts to the nearby watercourse and surrounding agricultural land. The land on the Site can continue to be used for agricultural purposes (sheep grazing or similar) or for biodiversity enhancement following installation of the panels.

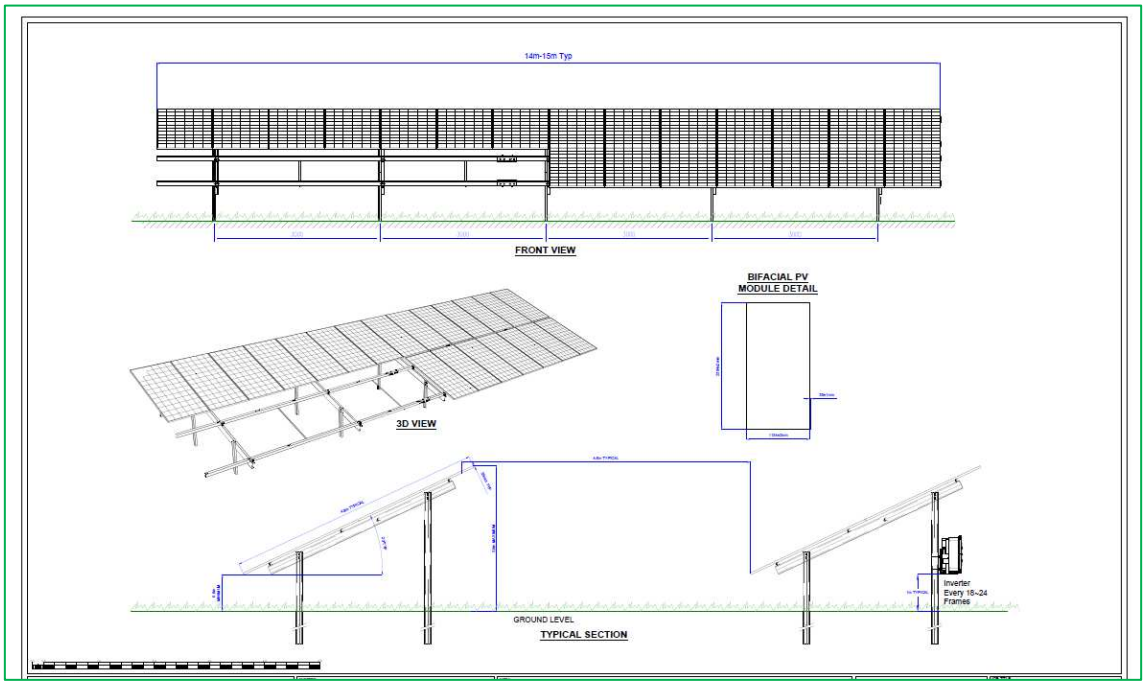

Figure 6 - Flow Paths over PV modules

The proposed transformers, grid connection and substation structures will be constructed from impermeable surfaces however, these will stand on an area of permeable surfaces. The inverter are positioned on legs raised above the base. The cabin plinths will be founded on concrete pads surrounded by permeable surfaces. Filter strips will be constructed to surround the concrete bases of these ancillary buildings/structures to capture any runoff from the roofs, which in turn will be conveyed to the wide cross-contour perimeter swale around the downstream boundary of the Site.

The proposed access tracks that will be used to service the transformer units will be constructed from permeable material. This will ensure that the access tracks remain permeable allowing surface water to infiltrate into the soil substrate therefore, the access tracks will not result in an increase in the impermeable area. In order to manage any surface water exceedance from the permeable tracks, swales will be incorporated to convey the water to the cross-contour perimeter swale at the downstream boundary of the Site in order to maintain downstream/downslope water quality.

There should, therefore, be no perceivable changes to the upstream or downstream hydrology and to flood risk as a result of the proposals. In terms of surface water runoff, the proposals will not increase the impermeable area on the Site, as the size of the transformer cabins and PV modules are considered to be negligible in the context of the Site areas. Therefore, there will be no perceivable changes to the upstream or downstream hydrology and flood risk as a result of the Proposed Development.

Figure 7 - Typical View of Arrays with Joints which Distribute Runoff

It is generally accepted that the presence of solar panels on a site may slightly change the pattern of runoff with the potential for minor erosion at the base of the panels. There is empirical evidence of the effect of solar development, a research paper[3] found that, with well-maintained grass underneath the panels, the solar panels themselves did not have a significant impact on the runoff volumes, peaks or time to peak. Their analysis did find that, with bare ground or gravel cover beneath the panels as a result of design decisions or lack of maintenance, peak discharge may increase resulting in the need for stormwater management.

Natural England has provided guidance on solar parks in the form of Technical Information Note (TIN) 101, (although this is English guidance the research is still applicable to Wales) and it provides useful information. This guidance provides an overview of the potential effects and possible mitigation measures for soil erosion and increased runoff, amongst others. TIN101 states that *"The key to avoiding increased run-off and soil into watercourses is to maintain soil permeability and vegetative cover. Permeable land surfaces underneath and between panels should be able to absorb rainfall as long as they are not compacted and there is some vegetation to bind the soil surface."*

TIN101 concludes that *"the risks of run-off and soil erosion are lowest on low gradient land with cohesive soils and highest on dry, sandy and steeply sloping soil surfaces";* this highlights the effect of slope on runoff rates and soil erosion. Furthermore, the slope aspect of the land can also have an effect on runoff rates and soil erosion. The aspect of the solar panels will always be south-facing (in the UK) and, therefore, north or south facing slopes will result in runoff flowing in a parallel direction to that of the runoff from the panels thereby remaining relatively diffuse and unlikely to result in concentrated flows that could cause soil erosion, apart from where very steep slopes occur.

The Proposed Development is considered to have a relatively low gradient, with south- facing slope. A tussock grassed surface will be maintained at the Site to reduce the likelihood of overland flow or soil erosion occurring which, based on this assessment, is considered to be low.

Any local erosion which might result from this trend will be mitigated by the thick sward of tussocky grass germinated both beneath and between the panels and its regime of regular maintenance and therefore, there will be no increase in flood risk off the Site.

[3] Cook and McCuen (2013) Hydrologic Response to Solar Farms, pg 536-541, Journal of Hydrologic Engineering, ACSE, May 2013.

As there is no history of surface water flooding at the Site it is likely that the current drainage system is sufficient for the current and proposed Site use. The surface water runoff will not increase post-application compared to pre-application and there will be no increase in surface water flood risk to the Site and offsite locations. No changes to the current surface water network are proposed. Following development, surface water flows from the Site will continue to discharge to the ground.

4.3 Surface Water Management During Construction

The surface water management during construction will include the following measures:

- Soil management practices to reduce runoff
- Erosion and sediment control
- No works undertaken until a wide perimeter cross-contour vegetated swale is constructed around the downstream boundaries of the Site.

The limits of topsoil stripping will be minimised at the Site to reduce Site runoff volumes. Preserving the quantity and quality of the Site topsoil is critical to preserving the Site runoff rates both during and after construction and to promote stabilisation vegetation establishment. Topsoil stripping will be limited to the areas necessary for access road and construction and for the creation of temporary laydown areas, as required. All stripped topsoil must remain on the Site and be reused for landscaping or restoration.

All access tracks and the compound area will be constructed using permeable granular materials. Vehicular movements will be restricted to the access tracks and designated areas where possible to avoid or limit soil compaction, which could have a detrimental impact on infiltration rates.

Erosion and Sediment Control Measures

The various construction activities required to construct the Proposed Development include minor grading activities and general construction traffic. If left unmitigated, these activities will result in impacts ranging from disturbance of soils to potential erosion and sediment transport to offsite locations.

Erosion control will be achieved primarily by:

- Managing disturbed soils using soil conservation practices to reduce runoff and sediment transport during construction.
- Constructing barriers to filter runoff.
- A construction entrance feature (“mud mat”) will be provided at the Site entrance to minimise the offsite transport of sediment via construction vehicles.
- The access road will be cleaned of any sediment deposited by Site construction traffic.
- Stabilise topsoil stockpiles expected to be left in place longer than 30 days with vegetative cover (i.e., hydroseeding) or a rolled erosion control product in the event of unfavourable growing conditions (i.e., during the winter).
- Re-vegetate all disturbed areas where construction is not expected for 30 days with a minimum 50mm of topsoil and hydro-seeding or other stabilizing vegetation / erosion protection measures. If vegetation establishment is not possible, given seasonal

restriction or other revegetation limiting factors, the disturbed area should be stabilised against erosion impacts by non-vegetated means such as erosion control blankets.

- In the event of inclement weather or unfavourable terrain for construction, construction best practices, such as temporary rig-mats may be used to prevent disruption of surface soils and vegetative cover by construction vehicles and equipment.

The erosion control measures shall be maintained in good repair during the entire construction period and removed as contributing drainage areas are restored and stabilised.

4.4 Surface Water Management Post Construction

The following design features will reduce the risks from surface water runoff from solar panels by promoting dispersion and infiltration:

- The gap between panels will be sufficient (typically 20 mm) to allow drainage to ground rather than onto adjacent panels.
- The ground surface around and between the frames will be maintained as grass to ensure that bare soil areas are minimised.
- The vegetated gap between rows of frames will be of greater width than that of each row of solar panels.
- Groundcover vegetation will be maintained in good condition in those areas receiving runoff from solar panels.
- Regular inspections and maintenance of the Site will be undertaken to ensure that vegetation cover is adequate and no rivulets are generated.

Runoff is expected to remain dispersed and unlikely to form channels. Broad grass strips around the edge of the array will also act to impede drainage of surface water to field margins. The proposed transformers will be sufficiently small so that measures to attenuate surface water will not be required. The runoff will shed onto the surrounding ground where it will naturally disperse.

Post-development, the land will become managed pasture without seasonal ploughing. Runoff will therefore contain lower silt loads than currently and perimeter grass strips around fields will reduce runoff to drainage ditches. Managed grassland will offer equivalent or better runoff management than the current situation. Over the long-term, runoff from the area occupied by the solar array is likely to be an improvement on present conditions

The proposed PV modules will consist of an aluminium frame, with stainless steel supports and/or concrete shoes in sensitive areas. Greenfield conditions will be retained as alluded to in the BRE Planning Guidance for the Development of Large Scale Ground Mounted Solar PV Systems . Although the solar panels will divert the downward path of falling rain, being raised off the ground on frames, they will not reduce the permeable area where they are sited. Any rainfall that does fall onto the Site will, as now, infiltrates into the soil substrate.

It is anticipated that rain falling on each of the solar PV modules will fall underneath the downslope of the panels. A gap of approximately 20mm will allow water to drain off each PV module (the 20mm gap surrounds all sides of the panels). The land on the Site can continue to be used for agricultural purposes (sheep grazing or similar) or for biodiversity enhancement following installation of the panels.

4.5 Conclusion

There should be no perceivable changes to the upstream or downstream hydrology and to flood risk as a result of the proposals. In terms of surface water runoff, the proposals will not increase the impermeable area on the Site, as the size of the inverter house and PV modules are considered to be negligible in the context of the Site areas.

Research into the impact of solar farm panels on runoff rates and volumes indicates that solar panels do not have a significant impact on runoff volumes, peak rates or time to peak rates when the ground below the panels is vegetated. Therefore, with well-maintained grass underneath the panels, the solar panels themselves will not have a significant impact on the runoff volumes, peaks or time to peak.

5.0 JUSTIFYING THE LOCATION OF THE DEVELOPMENT

5.1 Assessment of Acceptability Criteria

The main Site is located within FMfP Flood Zone 1 with less than a 1 in 1000 (0.1%) annual probability of flooding in a given year, including the effects of climate change. A section of the cable route is located within FMfP Flood Zone 2 with between 0.1% to 1% (1 in 1000 to 1 in 100) chance of flooding from rivers in a given year, including the effects of climate change, however, the cable route will be located underground within the existing carriageway of the road and will therefore not be vulnerable to flooding.

This indicates that the Acceptability Criteria is not applicable and there is no need to consider flood risk further. The Proposed Development is appropriate for this location. The development proposals should be considered by the LPA to satisfy the Acceptability Criteria as set out in TAN15.

6.0 SUMMARY AND CONCLUSIONS

6.1 Conclusion

In conclusion, a solar farm, would be expected to remain dry in all but the most extreme conditions. Providing the recommendations made in this FCA are instigated, flood risk from all sources would be minimised, the consequences of flooding are acceptable and the development would be in accordance with the requirements of the TAN15.

This FCA demonstrates that the Proposed Development would be operated with minimal risk from flooding, would not increase flood risk elsewhere and is compliant with the requirements of the TAN15. The development should not therefore be precluded on the grounds of flood risk.

APPENDICES

APPENDIX 1 – Proposed Site Layout

KEY

- PLANNING APPLICATION BOUNDARY
- PROPOSED PERIMETER DEER FENCE
- PROPOSED PALISADE SECURITY FENCE
- PROPOSED CABLE ROUTE
- PROPOSED ACCESS TRACK
- PROPOSED PV PANELS
- PROPOSED SPARES CABIN
- PROPOSED TRANSFORMER
- PROPOSED DNO SUBSTATION
- PROPOSED CUSTOMER CABIN

REV	DESCRIPTION	DATE	BY

CLIENT

WINDEL SOLAR 8 LTD

siriUS Planning
4245 Park Approach, Thorpe Park, Leeds. LS15 8GB. 0113 264 9960

JOB TITLE

ELY VALLEY SOLAR FARM

DRAWING TITLE

SITE LAYOUT

DRAWN	DATE	APPROVED	DATE
S.T	23/5/2025	J.C	23/5/2025

SCALE	SHEET	DRAWING NUMBER	REVISION
1:2000	A2L	WN1011/04/03	0

0,0 50,0 100,0 150,0 200,0 250,0

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