

# FLOOD RISK ASSESSMENT

NOVEMBER 2023

**8.61kW GROUND MOUNTED SOLAR PV ARRAY FOR DOMESTIC  
USE**

**RIVERFORD HOUSE, ST. STEPHENS HILL, LAUNCESTON,  
CORNWALL, PL15 8HN**

**PA**  
pollardarchitectural

First Floor  
5 Barras Street  
Liskeard  
Cornwall  
PL14 6AD

tel : 01579 347361

email : [info@pollardarchitectural.co.uk](mailto:info@pollardarchitectural.co.uk)  
web : [www.pollardarchitectural.co.uk](http://www.pollardarchitectural.co.uk)

- 1. Introduction**
- 2. Baseline Conditions**
- 3. Approach to the Flood Risk Assessment**
- 4. Flood Risk to Site**
- 5. Flood Risk to Surrounding Area**
- 6. Flood Mitigation Measures**
- 7. Adherence to Local Authority Planning Objectives**
- 8. Summary and Conclusion**

## **1. Introduction:**

The proposal site has been identified as being within a Flood Risk Area. (Paragraph 167 of the National Planning Policy Framework (Revised 20 July 2021) states that:

When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment (\*). Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

- a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;
- b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;
- c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;
- d) any residual risk can be safely managed; and
- e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

Pollard Architectural has been commissioned to carry out a Flood Risk Assessment (FRA) for the proposed domestic ground mounted solar array. This has been carried out in accordance with the National Planning Policy Framework (NPPF) and Planning Policy Guidance (PPG). Potential impacts have been identified and mitigation measures proposed, where necessary

National Planning Policy Framework and Planning Practice Guidance:

This FRA has been undertaken with regard to the statutory requirements of the National Planning Policy Framework (NPPF) and with reference to Planning Practice Guidance (PPG) in relation to development and flood risk. The latter ensures that flood risk is taken into account at all stages of the planning process and to avoid inappropriate development in areas potentially at risk of flooding.

The PPG does not specifically classify the flood risk vulnerability of solar arrays. It is considered that solar arrays, particularly ground mounted domestic arrays are 'less vulnerable' developments, where they are not associated with an electrical substation. As such applications for some minor development and changes of use should not be subject to the sequential or exception tests...

## **2. Baseline Conditions:**

The application [PA23/06443] seeks to provide a 8.61 kW ground mounted solar PV system on land adjacent the properties residential curtilage. The site is located within the town of Launceston in North Cornwall.

The site and surrounding land is currently used as an extensive paddock in association with the main property Riverford House. The site is bounded to the north by an elevated playing field serving St. Josephs School along with extensive gardens serving residential properties on St. Stephens Hill. To the west and south by the River Kensey (a tributary of the River Tamar), further south by the Kensey Vale Bowling Club and to the east by further residential property on West Bridge Road.

### **Topography**

The site is located on gently sloping land, with a southerly decrease in elevation towards the River Kensey. The northern boundary where the panels are to be located lies approximately 73.5 metres above Ordnance Datum, while the southern boundary is significantly lower and lies at approximately 70 metres above Ordnance Datum.

### **Water features**

The characteristics of the hydrology of the Site and its environs are derived from Ordnance Survey maps.

There is no evidence of permanent watercourses or waterbodies being present within the Site.

The nearest watercourse is the River Kensey, located adjacent to the southern boundary of the Site. This watercourse is designated as a Main River by the Environment Agency and flows eastwards towards the River Tamar.

### **Proposed Development**

The Planning Application area is 0.004 ha. The rather insignificant proposal area will contain ground-mounted photovoltaic (PV) panels mounted in a single row on frames, A total of 21 modules are planned for the Site. The panels will have a ground clearance of approximately 200mm and face due south with the rows aligned west-east. The proposed layout and design can be identified on accompanying application drawings 2335-01, 2335-02, 2335-03 and 2335-04.

Cables will be buried and routed to Riverford House. The Site will be accessed from the private access serving Riverford House as identified on drawing 2335-01. A precautionary approach to the design of the Site has been taken. Therefore, the solar array incorporates a buffer zone of approximately 40m from the River Kensey in compliance with local planning policy and Environment Agency flood zone requirements. This zone will be free of solar panels and other infrastructure associated with the solar array. Also, inverters/transformers will be positioned at Riverford House well outside any risk area and as far from the watercourse as practical and outside areas susceptible to surface water ponding.

The development proposal does not require major alteration to the topography, the existing levels in proximity of the proposal will remain predominantly unaltered. The proposed development should not affect the flood risk; the proposal can be accommodated without harm to the existing infrastructure.

### **3. Approach to Flood Risk Assessment:**

#### **Flood Risk**

This FRA considers the likelihood of flooding, the associated hazards and the vulnerability of the flood receptor. These factors are combined to produce the single measure, 'flood risk'.

Requirements for the assessment of flood risk are addressed by due consideration of NPPF and PPG, along with guidance provided by Cornwall Council.

The NPPF guidance does not specifically classify sites used for solar energy generation (Table 2: Flood Risk Vulnerability Classification); however, the Site is not intended for residential or emergency services, and as such considers such developments to have a 'less vulnerable' classification. The NPPF guidance recommends this land use classification as appropriate development within all flood zones, aside from the functional floodplain (Zone 3b).

#### **Design event and flood source**

As required by the NPPG, the return period to be considered for fluvial and rainfall events is 100 years and the effects of climate change need to be factored into the assessment as described later within this section of the report.

This FRA considers the following sources of flood risk, there being no reservoirs upstream of the Site:

- Fluvial (river) flow
- Pluvial (surface water) run-off
- Groundwater
- Sewer and/or water mains leakage

Pathways for flooding may involve two or more such components in sequence, such that the type of flow at the source is not the same as that delivering flooding to the receptor.

Within this FRA, flood risk to both internal and external receptors is assessed with reference to interactions between development at the Site and the sources of flooding listed above. For internal, but not external, receptors this gives information on the degree of flood hazard and hence the degree of flood risk. In the case of external receptors, flood hazard and hence flood risk during the design events is not evaluated. Instead, the potential for the development to qualitatively increase or decrease flood risk at external receptors is assessed so that targeted measures to ensure a qualitative reduction can subsequently be taken, if necessary.

***The proposals put forward are to be constructed with no major alteration to the existing topography. Ground levels are to remain as existing with little to no alteration to the topography of the land, immediately adjoining the development.***

### 3. Approach to Flood Risk Assessment – continued...

#### Climate Change

Within the UK, projections of future climate change indicate that there will be more frequent, short duration, high intensity rainfall events and periods of long duration rainfall. The NPPF recommends that the effects of climate change are incorporated into Flood Risk Assessments. Recommended precautionary sensitivity ranges for peak rainfall intensities and peak river flows are outlined in the Environment Agency document, 'Adapting to climate change: Advice for flood and coastal erosion risk management – authorities (April 2016)' and are summarised in Table 2962/FRA/T1, below.

2335/FRA/T1: Recommended increases due to climate change

Component	Years		
	'2020s' (2015 to 2039)	'2050s' (2040 to 2069)	'2080s' (2070 to 2115)
Peak rainfall intensity – Upper estimate	+10%	+20%	+40%
Peak rainfall intensity – Central estimate	+5%	+10%	+20%
peak river flow allowances – upper estimate	+25%	+35%	+70%
peak river flow allowances – higher estimate	+15%	+25%	+35%
peak river flow allowances – central estimate	+10%	+15%	+25%

In line with Government policy the lifespan of the development is assumed to be 25 years. Therefore, given the development's 'low vulnerability' to flooding a climate change uplift in rainfall of 10% and river flow of 15% to 25% would be assumed if surface runoff calculations or river level modelling were required.

Given the absence of significant areas of impermeable surfaces within the proposed development surface runoff calculations have not been required.

In terms of fluvial (river) flood risk, CDC (Section 2.3, SFRA Level 2 May 2017) suggest that in the absence of detailed modelling of a 1 in 100-year (1% AEP) plus 20% climate change flood level, the 1 in 1,000 year (0.1% AEP) outline (boundary between Flood Zones 1 and 2) can be used as a proxy.



#### **4. Flood Risk to Site:**

##### **Fluvial Flooding**

The Environment Agency accepts that Fluvial and Tidal Flooding events are more common and that the primary source of flood risk to the site is fluvial (river) flooding from the River Kensey.

- The Environment Agency indicative flood map shows that the entire site is in Flood Zone 1 (less than 1 in 1,000 annual probability of river or sea flooding) and not at risk from either fluvial or tidal flooding.

Whilst areas near the northern boundary of the Site are shown by the Environment Agency's 'Flood Map for Planning' to be in Flood Zones 2 and 3, these areas are well above the anticipated highest predicted levels. The layout of the solar array will align with the boundary on the outer-most limit of the identified flood risk area with a probability of less than 1 in 1,000 (0.1%) each year.

It is apparent that flood zone outlines do not align with the topography of the River Kensey and in particular the area of land to the south of the application site. This discrepancy appears to be most marked along the northern most boundary of the site where the irregular shape of flood outlines does not match the channel or the contours marking the edge of the floodplain. Whilst flood outlines on the southern bank exhibit localised discrepancies with topography they are more closely aligned with the general shape of the channel and floodplain.

The precautionary approach incorporates mitigation for the effects of climate change which are absent from published flood outlines. i.e. guidance provided states that in the absence of detailed modelling of a 1 in 100-year (1% AEP) plus 20% climate change flood level, the 1 in 1,000 year (0.1% AEP) outline can be used as a proxy. A climate change uplift of 20% is compatible with guidance values for this type of development and life span.

Therefore, fluvial flood risk to the developed part of the Site is low and no mitigation is required other than the precautionary approach to the site layout mentioned above.

##### **Surface Water Flooding**

Surface water flooding occurs when rainwater does not drain away through the normal drainage system or soak into the ground, but instead, lies on or flows over the ground. This can typically happen following high rainfall storm events.

The Environment Agency's mapping of 'Risk of Flooding from Surface Water' indicates that the majority of the Site has a zero risk of surface water flooding.

No mitigation is proposed other than the precautionary measures mentioned above.

##### **Groundwater Flooding**

The risk of groundwater flooding at the Site is considered to be 'low'.

##### **Flooding from sewers and water mains**

Sewage and water mains are not considered to represent a risk to the Site, due to its semi-rural location.

## **5. Flood Risk to Surrounding Area:**

### **Sources of flood risk**

The main potential sources of flood risk from the Site to external receptors are as follows:

- i) Increased run-off due to changes in run-off characteristics of the Site
- ii) Loss of floodplain storage due to construction of above ground structures
- iii) Alteration of flood flow paths by construction of above ground structures

### **Surface runoff flood risk**

The construction of solar panels along the small area of the northern boundary of the Site is unlikely to cause a significant change to the magnitude of surface run-off from the Site. Rainfall will drain from the panels onto natural ground, where it will either dissipate through infiltration or runoff to the River Kensey.

### **Flooding from sewers and water mains**

Sewage and water mains are not considered to represent a risk to the Site, due to its semi-rural location.

### **Fluvial flood risk**

The proposed development will not involve the construction of any above ground structures or ground re-profiling within the River Kensey floodplain and its margins (Flood Zones 2 and 3). Therefore, the development will not result in a loss of floodplain storage or an increase in fluvial flood risk to external areas as a consequence. The proposed development will not create infrastructure within the floodplain or its margins (Flood Zones 2 and 3).

Therefore, the development is not expected to increase fluvial flood risk to external areas as a consequence.



## **6. Flood Mitigation Measures:**

The primary source of flood risk to the Site is from the River Kensey. A precautionary approach to the site layout has been taken. Therefore, all infrastructure will be positioned well outside any potential flood zone and in close proximity to the host dwelling 'Riverford House' and as a result no mitigation for fluvial flood risk will be required.

Surface water flooding is currently localised to a few areas across the Site. As the PV arrays will be placed on ground-mounted frames with at least a 200mm ground clearance, surface water will not be a risk to the panels themselves. Inverters/transformers will be positioned outside any potential flood area, away from localised depressions where water is liable to pond. As no resurfacing of the Site is proposed and the footprint of the array will be small it is not anticipated that internal drainage will significantly increase flood risk to external areas.

Other sources of flooding are not considered to be a significant risk.

## **7. Adherence to Local Authority Policy Objectives:**

Cornwall Council must recognise the ground-mounted solar PV arrays as 'less vulnerable' development under the PPG flood risk vulnerability classification. The proposed development is therefore suitable for placement in Flood Zones 1 to 3a according to policy documentation.

The positioning of the solar panels complies with the objectives set out in the Cornwall Council Policy guidance:

The development also complies with Cornwall Council Local Plan policies:

- Policy 14: Renewable and low carbon energy
- Policy 15: Safeguarding renewable energy
- Policy 21: Best use of land and existing buildings. Both mitigating and adapting to Climate Change by using Flood Zone 2 as a proxy for the 1%AEP climate changed event to position the solar array
- Policy 26: Flood risk management and coastal change – no significant or permanent change to ground cover and thus runoff, Sustainable Drainage Systems (SuDS) - surface runoff will be dispersed to ground through natural infiltration

## **8. Summary and Conclusions:**

The primary source of flood risk to the Site is fluvial (river flow) from the River Kensey, however given the small-scale form of development the proposed array and its use of existing access points is considered to have a negligible impact.

There will be no significant change to site run-off characteristics or loss of floodplain storage. Therefore, the development is not expected to cause a noticeable increase in flood risk to external areas. The proposed development conforms to local planning policies regarding the layout and positioning of development relative to the floodplain and a substantial buffer distance from the watercourse has been maintained .

Therefore, it is considered that the proposed development will not experience an unacceptable level of flood risk or cause a significant increase in flood risk to external areas.