Our ref: PREFR/23-000018
Your ref: Guanockgate Road Gorefield
Date: 08/09/2023
Doc no: 201109628
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Proposal: New solar photovoltaic (PV) farm at Land east of Guanockgate Road, Gorefield, Cambridgeshire PE13 4PL

Dear Harman,

Thank you for your pre-application meeting with the Flood and Water Team at Cambridgeshire County Council on 29th August 2023 in relation to Guanockgate Road, Gorefield, Cambridgeshire, PE13 4PL.

As Lead Local Flood Authority (LLFA), Cambridgeshire County Council has a lead responsibility for managing the risk of flooding from surface water. Responsibility for managing the risk of flooding from main rivers, reservoirs, estuaries and the sea remains with the Environment Agency (EA); therefore, our response focuses on surface water management in relation to the above proposed development.

We have prepared the below advice from the documents provided to the LLFA for the approximate site boundary in Figure 1. The applicant has provided the following documents for review; therefore, this report will focus on surface water flood risk and the proposed surface water scheme.

- Preliminary Flood Risk Assessment, Floodline Consulting, Ref: FCL/644/01. Rev: A, Dated: 25th April 2023
- Environment Agency Advice, Danielle Maclean-Spencer, Ref: AN/2023/134218/02-L01, Dated: 7th June 2023
- Mitigations Plan, Pathfinder Clean Energy, Ref: UKZ157_10, Rev: 3, Dated: 3rd November 2023
- Layout Plan, Pathfinder Clean Energy, Ref: UKZ157_09, Dated: 3rd November 2022

1. Introduction

The site is situated east of Guanockgate Road, Gorefield, Cambridgeshire, PE13 4PL. The proposals of the development comprise of a new solar photovoltaic (PV) farm. The site is greenfield agricultural land.

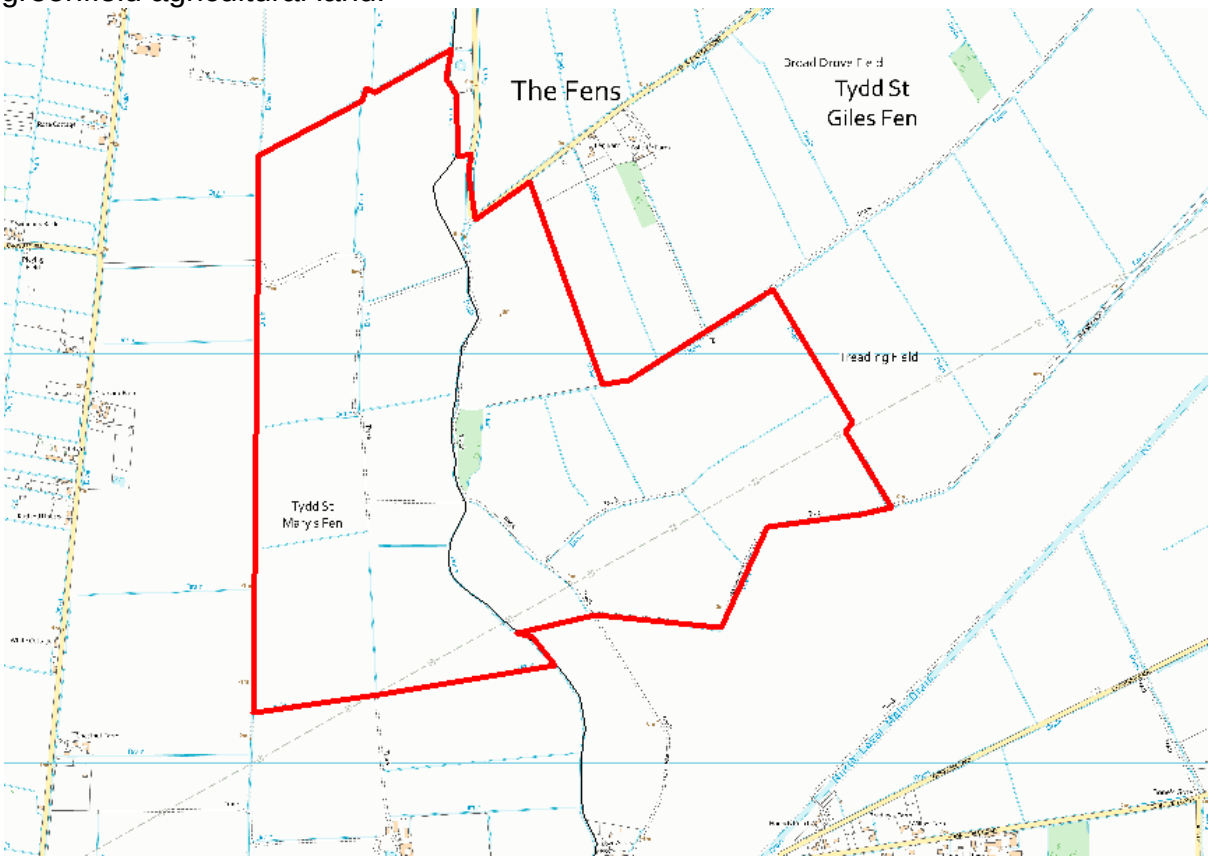


Figure 1: Site Boundary for Pre-Application Advice

2. Surface Water Flood Risk

The surface water flood risk at the site can be seen in Figure 2, which shows that there are areas of low surface water flood risk. These do not appear to be overland flow paths and are likely due to local topographical depressions.

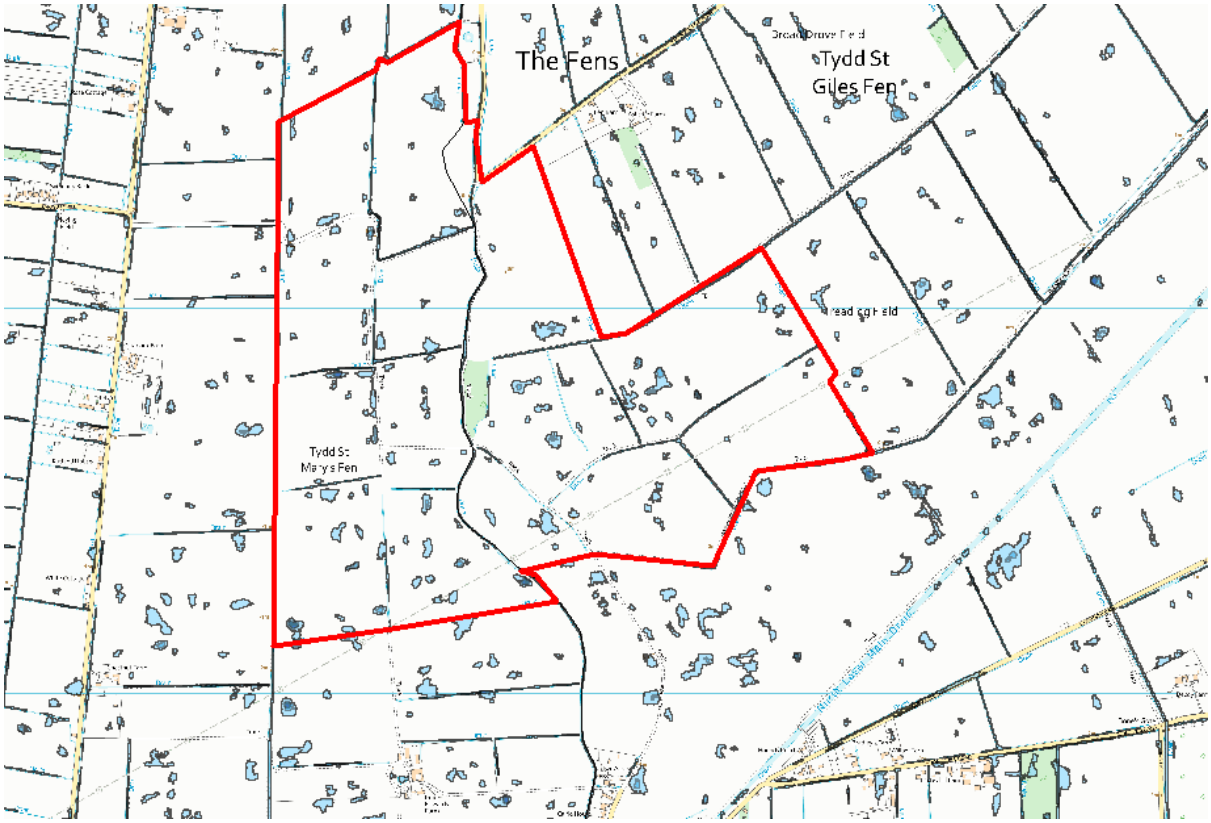


Figure 2: Surface Water Flood Risk Mapping (Source: GOV.UK)

3. Local Watercourses

The Lady Nunn's Old Eau watercourse intersects the site in a north south direction before discharging into the North Level Main Drain. The Treading Drain is located on the eastern boundary with a series of smaller ditches throughout the site which drain into the main watercourse. These watercourses are part of the North Level District Internal Drainage Board.

It should be noted that the LLFA does not support the culverting or in-filling of ditches within developments and would request that the site layout is designed with any existing water features in mind. This is due to the increase in flood risk to the upstream environment associated with in-filling and culverting of water courses.

The site layout should account for the existing drainage infrastructure, ensuring clear access for maintenance of all components of the drainage system by a management body. This should include a suitable easement for any maintenance equipment that may be required for future maintenance works.

Constructions or alterations within an ordinary watercourse (temporary or permanent) require consent from the Lead Local Flood Authority under the Land Drainage Act 1991. Ordinary watercourses include every river, drain, stream, ditch, dyke, sewer (other than public sewer) and passage through which water flows that do not form part of Main Rivers (Main Rivers are regulated by the

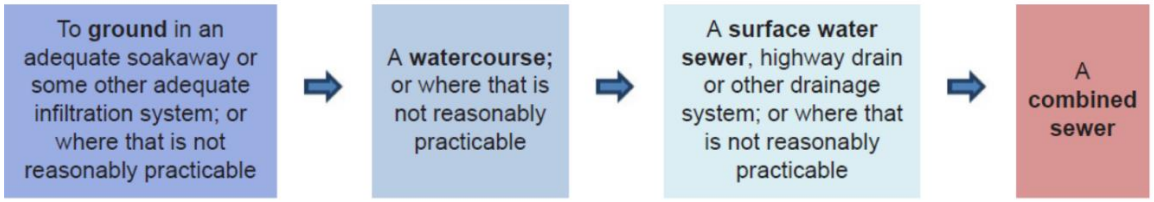
Environment Agency). The applicant should refer to Cambridgeshire County Council's Culvert Policy for further guidance:

https://www.cambridgeshire.gov.uk/business/planning-and-development/water-minerals-and-waste/watercourse-management/

Please note the council does not regulate ordinary watercourses in Internal Drainage Board areas.

4. Surface Water Drainage Strategy

As required by the building regulations and Planning Practice Guidance, surface water must discharge to the following, listed in order of priority:



4.1. Infiltration

Infiltration is the first choice for surface water disposal. The results of infiltration testing, in accordance with BRE365, should be provided as part of any formal planning application in order to demonstrate that the method of surface water disposal has followed the above Surface Water Disposal Hierarchy.

Whilst it is broadly accepted that solar farms do not respond in the same way as impermeable surfaces, consideration must be given to the impact that solar photovoltaic farms have on infiltration. Localised channelling of rainfall and the nature of underlying groundcover and antecedent conditions can influence infiltration rates and surface water run-off characteristics of a site, i.e. if the ground cover beneath panels is proposed as bare earth which is susceptible to hardening in summer months, then peak discharge can increase significantly increasing flood risk downstream. As such, it should be ensured as part of any proposed scheme that grass or wildflower cover will be well-maintained across the site to ensure that proposed schemes will not increase the surface water run-off rate, volume or time to peak compared to the pre-development situation. This will also help provide net biodiversity gain.

During the establishment of vegetation alternative methods of surface water disposal are required.

If infiltration is not a feasible means of surface water disposal, the applicant must consider discharging all surface water to a watercourse.

4.2. Discharge to Watercourse

The applicant may choose to direct surface water toward the watercourses during the establishment of vegetation. However, IDB consent will be required but may be conditioned.

Options such as the inclusion of a French drain at the base of each row to intercept flows, inclusion of a swale(s) at the lowest parts of the site and designing panels with horizontal slots across the surface area should be considered as measures to manage surface water.

In accordance with the Surface Water Disposal Hierarchy, this option needs to be thoroughly explored before the LLFA would accept discharge into a surface water sewer.

If it is proposed to discharge into a watercourse this should be shown on a plan. We will require evidence that the watercourse itself has an outfall and is in a suitable condition to receive surface water. The lack of detailed information on these grounds may increase the level of uncertainty we have about the effectiveness of a drainage strategy. If this degree of uncertainty is great, then as LLFA we would have grounds to object to the drainage proposal.

4.3. Peak Flow Control

Runoff from the site must mimic natural drainage as closely as possible. As the new development will be located on a greenfield site, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 100% and 1% annual exceedance probability (AEP) (including an appropriate allowance for climate change) critical rainfall event is required to discharge at the greenfield runoff rate for the same event.

Further information on peak flow control can be found in Section 3.3.2 of the CIRIA SuDS Manual (C753).

4.4. Existing and Proposed Runoff Rates

Calculations for the existing peak runoff rates (l/s/ha) should be provided for the following storm events:

- 100% annual exceedance probability (AEP) (1 in 1)
- 3.3% AEP (1 in 30)
- 1% AEP (1 in 100)

The above information is required to be submitted as part of the formal application to demonstrate that the runoff rate is restricted in accordance with Section 6.3.6 of the Cambridgeshire Flood and Water Supplementary Planning Document (SPD). Consideration should be given to sub-catchments that may exist on site and individual calculations should be provided per sub-catchment where appropriate.

4.5. Existing and Proposed Runoff Volumes

Calculations for the existing peak runoff volumes (m^3/ha) should be provided for the following storm events using FEH rainfall data:

- 100% AEP (1 in 1)
- 3.3% AEP (1 in 30)
- 1% AEP (1 in 100)

It should be noted that, runoff volumes from the developed site will usually increase in comparison to the site in its natural condition; this may increase flood risk in natural receiving systems. Controlling the volume of runoff from the site is therefore vital to prevent flood risk in natural systems. As such, the runoff volume from the development site to any surface water body or sewer in the 1% AEP (1 in 100), 6 hour rainfall event must be constrained to a value as close to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the existing site. Where it is not reasonably practicable to constrain the volume of runoff, the runoff volume must be discharged at a rate that does not adversely affect flood risk.

4.6. Volume Control

An assessment of the volume of attenuation storage that will be required on site should be produced. This should be based on the 1% AEP plus climate change storm event and allowable discharge rate for the site. The method and volumes of attenuation should be identified and located on a plan of the proposed development. SuDS such as permeable paving, swales, green roofs, attenuation basins and wetlands should be preferred on all development sites ahead of conventional piped drainage measures.

Further information on volume control and the provision of long term storage can be found in Section 3.3.1 of the CIRIA SuDS Manual (C753).

4.7. Exceedance Flows

The surface water scheme must ensure the level of flood risk from the drainage system is acceptable for the site. For extreme events, the layout of the site should be designed so that any exceedance flows (those flows in excess of what the system has been designed to cater for) are safely managed in conveyance and storage zones.

If any above ground flooding is expected for the 1% annual exceedance probability (AEP) (1 in 100 year) rainfall event including an allowance for climate change, a plan showing the volumes, depths, velocities and extents should be mapped onto a topographical plan of the site (levels on the topographical plan should represent the post-development situation).

Flows that exceed the design criteria must be managed in flow conveyance routes that minimise the risks to people and property both on and off site. Any proposed building which may be affected by these flow routes must be suitably

protected and floor levels raised to ensure they are suitably protected for the lifetime of the development.

Further information on exceedance flow routing can be found in the CIRIA Designing for Exceedance in Urban Drainage guide (C635) (2006)

4.8. SuDS

The site's surface water drainage strategy must give priority to the use of SuDS as this is now a material planning consideration. SuDS are an approach to managing surface water run-off which seeks to mimic natural drainage systems and retain water on or near the site as opposed to traditional drainage approaches which involve piping water off site as quickly as possible. SuDS involve a range of techniques including soakaways, infiltration trenches, permeable pavements, grassed swales, ponds and wetlands. SuDS can offer significant advantages over conventional piped drainage systems in reducing flood risk by attenuating the rate and volume of surface water run-off from a site, promoting groundwater recharge, and improving water quality. SuDS can also be integral in the design and delivery of green infrastructure across a site.

Consideration should be given to surface water drainage from the highway and surface water treatment of these surfaces should also be in line with the principles set out in the CIRIA SuDS Manual.

Further information on SuDS within new developments can be found in:

- CIRIA SuDS Manual (C753) (2015)
- Code of practice for surface water management for development sites (BS 8582:2013) (2013)
- CIRIA Designing for Exceedance in Urban Drainage (C635) (2006)

4.9. Water Quality

The presence of impermeable areas across a development can increase the risk of pollution entering a watercourse or groundwater and the variability in the level of pollutants arising from urban runoff is great. To protect the quality of receiving water bodies, surface water runoff arising from the site should be of an acceptable quality. This can be achieved through pollution prevention measures, interception, treatment and maintenance.

The LLFA requires that the Simple Index Approach, as outlined in the CIRIA SuDS Manual, is used during the design of the system to ensure that all surface water discharging from the site by any means will receive suitable levels of treatment based on the hazard indices for the proposed land use.

Advice on water quality best practice can be found in Chapter 4 of the CIRIA SuDS Manual (C753).

4.10. Climate Change Allowances

Updated climate change allowances were published by the Environment Agency on 10th May 2022 and should be applied for all new developments. The peak

rainfall allowances are now provided for management catchments for both the 1% and 3.3% annual exceedance probability (AEP) rainfall events. The guidance on how to apply peak rainfall allowances has also changed, using the central allowance for development with a lifetime up to 2100 and the upper end allowance for development with a lifetime from 2100 to 2125.

The development is located within the Nene Management Catchment and the climate change allowances for this catchment are shown in Table 1 and 2 below.

3.3% AEP rainfall event		
	Central Allowance	Upper End Allowance
2050s	20%	35%
2070s	25%	35%

Table 1: 3.3% AEP rainfall event peak rainfall allowances for the Nene Management Catchment

1% AEP rainfall event		
	Central Allowance	Upper End Allowance
2050s	20%	40%
2070s	25%	40%

Table 2: 1% AEP rainfall event peak rainfall allowances for the Nene Management Catchment

For 1% AEP rainfall events, the 'central estimate' of 25% should be used for design purposes to assess the performance of the drainage system and ensure it can cope with the critical duration design rainfall event. The 'upper end' of 40% should be used in sensitivity analysis to assess the potential flood risk implications both on and off-site in the critical duration design rainfall event. When using the 'upper end' figure it must be ensured that surface water is wholly contained on site and that flood hazard is within acceptable tolerances. See 'Flood Risk Assessment Guidance for New Development' for further information on flood hazard.

Further information on how these changes should be applied can be found at:
https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

4.11. Maintenance and Management

In line with the Planning Practice Guidance (PPG), the design of a SuDS system needs to take into account the construction, operation and maintenance requirements of both the surface and subsurface components. An appropriate maintenance plan should be submitted with any planning application which covers the maintenance for the lifetime of the system for all SuDS elements. Such a plan will often be required as a condition of planning permission for a site.

Applicants should sufficiently consider the likely maintenance requirements of new and existing infrastructure, over its design life including the provision of funding. It is important that maintenance is also considered in the design of the

drainage system and the development site to account for the requirements of undertaking all stages of maintenance work such as ease of access whether this is for personnel, vehicles or machinery. This should include an adequately sized maintenance strip around open SuDS features such as ponds or basins to allow any machinery of vehicles to be able to access the basin for maintenance. As outlined in the CIRIA SuDS Manual (C753) this would ideally be 3.5m wide and designed to be able to withstand the use of maintenance vehicles. For features that do not require vehicular access for maintenance, should provide adequate and safe access for someone to be able to enter the feature to maintain the structure. For example, shallow side slops and easy access points.

5. Formal Application

Table 3 below, outlines a checklist of information that is required by the LLFA for a full application, which is to be submitted by the applicant at the formal planning application stage. The full details of which can be found within the LLFA's Surface Water Planning Guidance Document.

FULL CHECKLIST

Information Required	(✓)
Type of development (e.g. new development, extension to existing development, change of use etc.)	
Status of site (i.e. greenfield or previously developed)	
Total site area (ha)	
Existing impermeable area (ha)	
Proposed impermeable area / developable area (ha) including an allowance for urban creep	
Description of site topography	
Identification of watercourses within vicinity of site and their outfalls and associated flood risk	
Description of ground conditions (using site investigation reports where available) including information regarding geology and groundwater depth	
Identification of any surface water flood risk & proposed mitigation	
Existing site drainage arrangements	
Proposed method of surface water disposal (using drainage hierarchy) & evidence to support this	
Existing runoff rates (l/s/ha)	

Proposed runoff rates (l/s/ha)	
Existing runoff volumes (m^3/ha)	
Proposed runoff volumes (m^3/ha)	
Total required volume of attenuation (m^3)	
Appropriate consideration of climate change	
SuDS proposals (type, location, size)	
Infiltration test results in accordance with BRE365 (if proposing infiltration) or second viable option for surface water disposal if testing has not been undertaken	
Water quality	
Finished floor levels	
Evidence of in principle agreement from third party if discharging into their system	
Drainage layout drawing & supporting hydraulic calculations	
Management/maintenance plan and on-going maintenance responsibilities	
Site layout plans	

Table 3: LLFA full application requirements

Please Note:
Any advice given is an Officer's opinion based on the information you have supplied and without prejudice it is the right of the Officer to determine as it finds appropriate any subsequent formal application. Therefore, positive feedback in pre-application discussions does not automatically mean that an application will be granted acceptance, however it will increase the likelihood of a successful outcome

Yours sincerely,

Jessica Gething
Jessica Gething
SuDS and Flood Risk Officer

If you have any queries regarding this application please contact the relevant Case Officer (contact details are above).