Flood & Water Management

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Solar Farm Development Surface Water Drainage Strategies

Kent County Council (KCC), as the Lead Local Flood Authority (LLFA), acknowledges that solar farm developments are generally low risk in terms of surface water management, provided appropriate mitigation and management measures are implemented. While solar panels are impermeable, the areas beneath them remain permeable. SuDS-based measures can slow run-off from panel edges, convey flows beneath and between panel rows, and promote interception and infiltration to mimic pre-development greenfield conditions.

Research, including *Hydraulic Response of Solar Farms* (Cook and McGuen, 2013), shows that solar panels installed over grassed land do not materially affect run-off volume, peak discharge, or time to peak. However, where ground cover beneath panels is altered (e.g. gravel, hardstanding, patchy grass, or bare ground), run-off volumes increase significantly. Maintaining continuous grass and vegetation cover is therefore essential to prevent increased surface water flood risk to third-party land, property, and downstream receptors.

The LLFA will generally regard solar farm development as low risk from a surface water drainage perspective where:

- The site is underlain by permeable soils, which may be indicated by low greenfield run-off rates (e.g. 1 in 2 year rate is <3 l/sec/ha).
- Good coverage of long grass is provided beneath and between panel rows to help control surface water run-off at its source.
- Buffer strips of longer grass are used downstream of blocks of solar panels to interrupt any residual surface water flows and minimise the risk of overland flows.
- Access tracks are permeable, and appropriate drainage is provided for buildings and other impermeable areas.
- Rainwater harvesting is incorporated to capture a proportionate volume of run-off from the panels and/or ancillary buildings to meet non-potable water demand (e.g. cleaning of solar panels and landscaping maintenance / irrigation).
- Existing drainage features (e.g. ditches) are retained, with an appropriate set back for maintenance access, and maintained or enhanced where necessary.

- Appropriate measures are proposed during the construction of the solar farm to minimise risk of soil compaction and protect soil structure, drainage and agricultural quality.

- A maintenance plan is proposed to remediate bare, eroded, or compacted areas through reseeding, soil treatment, and includes measures to prevent compaction during subsequent maintenance activities (e.g. from wheeled machinery) for the lifetime of the development.

For large sites, steep slopes, or areas with low-permeability soils (including low-permeability superficial deposits over permeable bedrock), additional measures may be required to manage exceedance flows and prevent increased flood risk on or off site. Such measures may include perimeter buffer strips, bunds, swales, gravel-filled filter drains, and attenuation or flow controls to promote infiltration (where feasible) and/or limit discharge rates to receiving watercourses.

Grass seed mixes should align with the site landscaping strategy, support biodiversity and biodiversity net gain, and be suitable for shaded conditions beneath panels and areas prone to periodic waterlogging to maintain effective ground cover.

Local Planning Authorities should ensure that all measures within Flood Risk Assessments and Drainage Strategies align with landscaping and maintenance proposals and are secured for the lifetime of the development through appropriate planning conditions.