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Comment on the damage to land covered by Solar Panels

Comment from Cllr Marianne Overton MBE for deadline 3a of the Fosse Green Public Inquiry, following comments made at the Open Hearing on Wednesday 11th March 2026 and during the second Inquiry held over four days in the same week.

Policies on protecting soils and agricultural land are well described in the Local Impact Report of North Kesteven District Council. (page 40-44) This application includes 22.5% of best and most versatile land, that is the best in the country. 96.7% (1031ha) included in the Fosse Green solar industrial application is currently available for food production. At a time of international insecurity, we find that relying on foreign-owned, intermittent solar, 5.2ha of lithium battery storage (2 hours) and acres of industrial substation makes us less secure.

In weighing the impacts and benefits, the applicant appears to have undervalued the potential impact on soil resources, at page 216, regarding restoration of land to its former quality, the Applicant states “The Framework Soil Management Plan ……. contains industry standard good practice mitigation measures to reduce impacts on soil which will ensure that the ALC grade will be unaltered through operations and decommissioning of the Proposed Development.”

This needs to be secured through Requirement 20 of the draft DCO.

Why it is important; The Soil Association summarise: “Fertile, healthy soils are vital for our food security. Globally, they store an estimated 9.8 billion tonnes of carbon. If managed well, they can reduce greenhouse gas emissions; but if badly managed, soils turn from a store to a source of emissions. Soils can also help prevent floods and reduce the impact of droughts; but badly managed soils lose the ability to absorb and filter water, damaging water supplies and increasing flood risk. The government is committed to placing soil at the heart of UK farming, confirmed by the Secretary of State for Environment, Food and Rural Affairs (Defra).” (Ref To plough or not to plough” Tillage and Soil sequestration.)

In the quote from the Framework Soil Management Plan (7.10), the applicant claims no adverse impact on soil but provides no secure evidence. Our group asked Professor Dobson to comment on the impact of solar installations on Lincolnshire farmland. He has read most of around 40 papers on the topic selected the most relevant and describes this as “work in progress”

Professor Dobson comments: “I must emphasise that there are really no proper studies on the effect of solar panels on agricultural land in the UK conditions.”

Comment By Professor Peter J Dobson. (Oxford University)

“There have been many claims that land occupied by solar panels can be restored to agricultural use at the end of life. This is highly dubious and will be very expensive. This comment is in two parts: the evidence that soil is damaged by solar installations and the issue of returning it to agriculture.

Damage to the land by solar installations:

The construction of supports for the solar panels involves pile-driving steel supports of around 8 metres into a depth of up to 4 metres. This will result in serious damage by soil compaction and disruption of land drains.

Once installed, the land under and around the solar panels will suffer from major changes in the fungal and microbiome activity and a consequential reduction in carbon matter in the soil. This damage is likely to be permanent. There are very few independent published studies of this, and many of those are produced by groups with an interest in energy rather than agriculture.

Furthermore, of the 100 or so studies, most were applicable to the dry arid regions that exist in Southern Europe and the USA and for some of the scrubland desert regions of China. Among the significant studies is one in Italy by Moscatelli et al (1) that showed that after 7 years the soil was significantly altered in terms of nitrate, phosphate and carbon content under the panels and in the gaps between rows of panels. Microbial activity was greatly reduced under the panels, and the soil quality became patchy.

There are no studies of the changes in good agricultural land covered by solar panels for tens of years. The lesson learned from the scientific publications to date is that studies are not available for solar installations more than 7 years old, but all of the evidence from scores of papers does show that the population of soil bacteria are very much altered under panels, soil fungi less so.”

Quote from the Abstract of Moscatelli et al (1).

“The main results showed that seven years of soil coverage reduced soil fertility with a significant reduction in water-holding capacity and soil temperature, while pH increased. Under the panels soil organic matter was dramatically reduced -61% and -50% for TOC and TN respectively compared to the gap area, including a parallel decrease in microbial activity. The effect of the installations induced significant changes is soil chemical and biochemical properties.”

The French and UK Governments agreed to increase soil carbon by 0.4% annually to 2050 then to get 40% of UK soil into sustainable management by 2028, 60% by 2030 (This is contradicted by implementation of panels and the impermeable permanent surfaces of the Battery storage units and the solar industrial sites.

The poorer water-holding capacity under panels also has a knock-on impact for flooding, and part of the site does flood as the river regularly overflows its banks, near Bassingham. This is exacerbated as the steel supports are pile driven into the ground, breaking the drainage pipes in the field, increasing the likelihood of flooding events.

Professor Dobson continues,

“The most detailed studies by Siggers et al (2), were made in Colorado (USA), which has a latitude of 40 degrees North and is at high altitude of 1500metres. This study is excellent in that it cites specific detail of the sampling methodology, which has not been reported for any of the other published work.

Remediation of the land after solar installations have been removed:

“The acts of installing the solar panels will cause significant damage to the soil structure and drainage; As mentioned above there are many alterations to the nutrient composition and microbial population during operation and there will be further serious damage to the soil when the panels, and especially the steel supports are removed.”

Leaving the steel supports in situ could prevent full return to agriculture in reducing the opportunity for ploughing. Ploughing was traditionally deeper to control weeds and reduce use of herbicides. If the industry moves to still less chemical application to keep the waterways clean, then deeper ploughing is likely to be needed. There is little or no assurance of the practicality of cutting off the steel 600mm below the ground surface, without removing the soil and causing further disruption to the soil, archaeology and to the process of decommissioning.

The NKDC Local Impact Report describe removal and replacement of soil, but no clarity as to exactly where from or where to or how much, so not included in the traffic movements, noise and disturbance, particularly for adjacent villages such as Bassingham, looking out onto the panels, battery storage site and substation. The applicant's soil management plan describes removal and sale of soil off-site, sale of any commercial sand and gravel which would involve a quarrying operation, and landfill. All this without enough information to assess the impact. Then there is soil placement, where HGV's bring new soil on decommissioning, but again without enough information to assess the impact. In particular, the impact on the dwellings closest to substation and batteries would be hard hit. The impact of much of this application seems to be left to our imaginations, which makes weighing up the benefits and harm particularly difficult for the Inspector.
Recommendation: "The Developers and/or Operators of the site must take financial responsibility for the work that will be entailed in restoring agricultural function to the land." This supports the requirement for a bond and a percentage of the profits to be laid aside annually for decommissioning and soil restoration.
References
1) Moscatelli MC et al "Soil properties changes after seven years of ground mounted photovoltaic panels in Central Italy coastal area" Geoderma Regional 29, (2022), e00500. https://doi.org/10.1016/j.geodrs.2022.e00500
2) Siggers JA "Environmental heterogeneity imposed by photovoltaic array alters grassland soil microbial communities" Global Change Biology. 31, (2025), e70376. https://doi.org/10.1111/gcb.70376
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