Submission ID: 37687

The attached documents provide Additional Relevant Representations relating to:
- Effect on soil under solar panels
- Llanwern Solar Farm – Pollution and Biodiversity Loss
- Piling and likely damage to clay pipe drainage

Mr Paul Frost

Deadline 4 submissions

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Additional Relevant Representations

Effect on soil under solar panels

A scientific study has shown that after just seven years soil under solar panels has reduced fertility and reduced water holding capacity than the soil in the gaps between panels and on surrounding land.

The applicant states that the land will be able to be returned to agriculture after the project has completed. The study shows that after just seven years there is a significant striping effect with the soil under the panels exhibiting:

1. Modified fertility
2. Significant reduction in water holding capacity
3. Significant reduction in soil temperature
4. Dramatic reduction in soil organic matter (-61% and -50% for TOC and TN respectively)
5. Decreased microbial activity

It is almost certain that after 40 years the effects will be much worse than after the 7 years of the scientific study. The soil will not be fit to return to agriculture and will require a significant amount of time to recover if it ever does.

The application does not highlight this area in any of its worst case scenarios put forward. The amount of time the land will be unavailable for agriculture is vastly understated and should be examined in much more depth and highlighted as a significant effect in the inspectorates findings and recommendations.

The scientific study's citation is:

Maria Cristina Moscatelli, Rosita Marabottini, Luisa Massaccesi, Sara Marinari,
Soil properties changes after seven years of ground mounted photovoltaic panels in Central Italy coastal area,
Geoderma Regional,
Volume 29,
2022,
e00500,
ISSN 2352-0094,
https://doi.org/10.1016/j.geodrs.2022.e00500.
(https://www.sciencedirect.com/science/article/pii/S2352009422000207)
Abstract: Land use change is a major driver of soils' properties variation and potential degradation. Solar photovoltaic plants installed on the ground represent a key to mitigating global climate change and greenhouse gas emissions. However, it could represent an emerging source of land consumption, although reversible, which prevents the use of soils for agricultural purposes and may affect crucial ecosystems services. Despite the large widespread deployment of photovoltaic plants, their potential effect on soil properties has been poorly investigated. The aim of this study was to assess changes of soil physical, chemical and biochemical properties seven years after the installation of the panels. For this purpose, the soil under photovoltaic panels was compared with

the GAP area between the panels' arrays and with an adjacent soil not affected by the plant. The main results showed that seven years of soil coverage modified soil fertility with the significant reduction of water holding capacity and soil temperature, while electrical conductivity (EC) and pH increased. Additionally, under the panels soil organic matter was dramatically reduced (−61% and − 50% for TOC and TN, respectively compared to GAP area) inducing a parallel decrease of microbial activity assessed either as respiration or enzymatic activities. As for the effect of land use change, the installation of the power plant induced significant changes in soils' physical, chemical and biochemical properties creating a striped pattern that may require some time to recover the necessary homogeneity of soil properties but shouldn't compromise the future re-conversion to agricultural land use after power plant decommissioning.
Keywords: Vertisols; Luvisols; Soil fertility; Microbial activity; Organic matter; Land use; Solar parks

Llanwern Solar Farm – Pollution and Biodiversity Loss

In a detailed letter to The minister for Climate Change the Friends of The Gwent Levels and Gwent Wildlife Trust explain the failure in the Llanwern Solar Farm construction process to ensure the mitigations put into place were followed and appropriately monitored.

Results of post-construction monitoring show pollution and biodiversity loss. Below is an extract from the letter detailing these issues:

Pollution:
The post-construction monitoring report for the Llanwern solar farm shows that levels of several waterborne pollutants arising from the constructed solar farm have risen hugely since construction. For example, the pre-construction levels of suspended solids (silt) inside the development site were up to 7.4 million µg / litre respectively, compared with pre-construction sample levels of a maximum of 0.53 million µg / litre. Thus, the levels of this damaging pollutant produced by the solar farm were over 14 times higher than pre-construction levels.
Very high levels of total petroleum hydrocarbons TPHCWG (a very damaging pollutant adversely affecting the aquatic invertebrate and plant citation interest of the SSSI) were recorded inside the solar farm site, at 230 µg / litre, compared with a pre-construction level on the site of less than 10 µg / litre.
Even these very high levels of pollutants caused by the solar farm may be underestimates, because other pollutants, for example Nitrite as N and Nitrite as N02, were recorded at very much higher levels post-construction compared with pre-construction, but no NRW concern trigger level exists. It is important to stress
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that the wildlife interest of the SSSI is wholly dependent on a very high quality of water in the reens and ditches.
Biodiversity Loss:
No breeding lapwings used the "Lapwing Mitigation (really compensation) Area". Numbers of breeding lapwings fell from eight pairs pre-construction to two pairs post-construction, with only one nest found on site. Lapwing are a red list species with numbers dropping by 80% in Wales in the last fifty years.
A breeding pair of cranes was lost from the site. This is a species which had not bred in Wales for over 400 years. The return of these cranes a few years ago was marked as a success story for the Levels. Cranes as a species are making a slight recovery but the Llanwern development appears to have done the very opposite of assisting their recovery.
The diversity of bat species decreased markedly, and for the majority of locations, abundance of species has dropped dramatically (95- 100%).
The flora on the site has been severely damaged by the construction process and there is no evidence of any attempts to mitigate against this. The ground appears compacted and the panels have large areas of bare earth under and around them, with brambles starting to take over the area, in stark contrast to the grazing marsh habitat of the site before construction.
It should be stressed that this is merely a snapshot of the damage caused to the SSSI, and that further damage is likely to manifest itself as the years go by.

A copy of the entire letter will be uploaded for reference.

It is my view that there are insufficient safeguards included in the Springwell application to prevent similar issues occurring during it's construction phase.

The risk is too high for us not to put into place sufficient prevention mechanisms for these types of issue. The current application has monitoring and notification provisions should pollution be detected, but this is too late, the problem is already there and the affects on biodiversity will already have happened.

I would like to see a significant toughening of the provisions to put in place independent expert scrutiny and supervision of all elements of the construction processes. This body should be able to

advise on process and stop anything it considers an unsafe process. Unsafe in the context of damage to the environment, water courses and biodiversity rather than “Health and Safety”.

Piling and likely damage to clay pipe drainage

Throughout the examination phase of the application we have heard numerous concerns raised by interested parties about the likely damage to fragile clay pipe drainage that will be caused by piling operations in the construction phase of the project and the adverse affect any damage is likely to have on the surface water flooding issues experienced by residents of Scopwick village. Maps showing the extent and position of the drainage the concerns are regarding have been provided.

This risk is real and in my view has not been sufficiently addressed in the examination stage or by the draft DCO.

During the hearings the applicants legal representatives explained that there is a legal obligation upon them to make good any damage to drainage systems. That in itself is good and reassuring but again concerns were raised about the applicant actually knowing they had caused damage to an underground clay pipe and so knowing that they have something to make good. It seems only visible damage is currently covered.

With the knowledge that there are these fragile clay drains in close proximity to proposed piling operations I would like to see the applicant accept a higher level of care in this area and for it to be more thoroughly covered and provided for in the DCO please.

The risk is high and significant for the residents of Scopwick who as previously raised already have significant surface water flooding issues which we do not want to be made worse by construction damage.

It is my view that the DCO should be amended to oblige the applicant to proactively check that there has been no damage to any of the drainage systems post completion of their piling operations.

Please can this amendment to the DCO be considered by the inspectors and the applicant.

[redacted]
Minister for Climate Change
14th October 2022

Re: A Temporary Halt on Major Development on the Gwent Levels SSSI

Annwyl Weinidog,

As proposed in FOGL's previous letter of 21st July this year, Friends Of the Gwent Levels (FOGL) and Gwent Wildlife Trust (GWT) are now writing to you to provide you with evidence of a systemic failure to control, mitigate or compensate for serious damage to the Gwent Levels SSSI from development. This evidence consists of the results of post-construction monitoring for the only constructed solar farm on the Gwent Levels SSSI (Llanwern), and a mounting and widespread momentum for further, vastly accelerated deployment of solar on the SSSI. You may recall that our previous letter requested a temporary halt on major development on the SSSI for a period of 2-3 years, for the above reasons, and we are now reiterating that request.

FOGL and GWT's General Approach to Renewable Energy

We fully recognise that climate change is the biggest threat to biodiversity globally, and that concerted action at all levels and in all policy areas, including renewable energy generation, is needed. We further support the Welsh Government's renewable energy generation aspirations as set out in its Net Zero 2 document. However, climate change mitigation through renewable energy generation should not come at the expense of biodiversity, a fact recognised by the Senedd's declaration of a joint Climate and Biodiversity Emergency. There are many thousands of hectares of land and rooftops throughout Wales, (including Gwent) which are eminently suitable for solar generation, and there are many constructed and proposed solar projects in Gwent to which we have not objected. Developments are now approved on the basis that developers promise a benefit for biodiversity but our research shows no benefit and indeed shows further damage to the SSSI.

Results of Post-Construction Monitoring at Llanwern Solar Farm show pollution and biodiversity loss

Pollution:
The post-construction monitoring report for the Llanwern solar farm shows that levels of several **waterborne pollutants** arising from the constructed solar farm have risen hugely since construction. For example, the pre-construction levels of suspended solids (silt) inside the development site were up to 7.4 million µg / litre respectively, compared with pre-construction sample levels of a maximum of 0.53 million µg / litre. Thus, the levels of this damaging pollutant produced by the solar farm were over 14 times higher than pre-construction levels.

Very high levels of total **petroleum hydrocarbons** TPHCWG (a very damaging pollutant adversely affecting the aquatic invertebrate and plant citation interest of the SSSI) were recorded inside the solar farm site, at 230 µg / litre, compared with a pre-construction level on the site of less than 10 µg / litre.

Even these very high levels of pollutants caused by the solar farm may be underestimates, because other pollutants, for example Nitrite as N and Nitrite as N02, were recorded at very much higher levels post-construction compared with pre-construction, but no NRW concern trigger level exists. It is important to stress

that the wildlife interest of the SSSI is wholly dependent on a very high quality of water in the reens and ditches.

Biodiversity Loss:
No breeding **lapwings** used the "Lapwing Mitigation (really compensation) Area". Numbers of breeding lapwings fell from eight pairs pre-construction to two pairs post-construction, with only one nest found on site. Lapwing are a red list species with numbers dropping by 80% in Wales in the last fifty years.

A breeding pair of **cranes** was lost from the site. This is a species which had not bred in Wales for over 400 years. The return of these cranes a few years ago was marked as a success story for the Levels. Cranes as a species are making a slight recovery but the Llanwern development appears to have done the very opposite of assisting their recovery.

The diversity of **bat** species decreased markedly, and for the majority of locations, abundance of species has dropped dramatically (95- 100%).

The **flora** on the site has been severely damaged by the construction process and there is no evidence of any attempts to mitigate against this. The ground appears compacted and the panels have large areas of bare earth under and around them, with brambles starting to take over the area, in stark contrast to the grazing marsh habitat of the site before construction.

It should be stressed that this is merely a snapshot of the damage caused to the SSSI, and that further damage is likely to manifest itself as the years go by.

<u>The Levels as a whole under threat</u>

It is also important to bear in mind that in addition to the damage done directly to the SSSI by solar farms, such as that set out above, indirect damage b(oth cumulative with other developments and in combination with other damaging activities) would manifest themselves if further solar farms were constructed on the SSSI. The destruction of ecological connectivity and resilience would be inevitable if more and more projects were constructed on this fragile and complex wetland SSSI. This would be completely at odds with the Welsh Government DECCA (Diversity, Extent, Condition, Connectivity, Adaptability) approach to reversing climate change and biodiversity loss.

The catastrophic failure of mitigation measures delivered through planning conditions for the only constructed solar farm on the SSSI (or indeed any wetland SSSI in Wales) shows that mitigation has not remedied damage to the SSSI by development, even though the conditions were approved by the Inspector at the hearing, and by NRW, and set out in the Inspector's Report and Recommendations. Rather than delivering a measurable benefit, the Llanwern scheme has delivered only measurable losses.

All constructed developments on the Gwent Levels in recent decades will have had "mitigation" commitments attached to their planning permissions, and all of these will have been delivered through planning conditions and/or agreements or similar. Nevertheless, the damage continues and the Levels are acknowledged to be in decline. Ironically, it is the very fact that the Levels have been allowed to reach an unfavourable condition as a result of inappropriate management and damaging development that they are now being seen as 'fair game' for development which promises – but has failed to deliver – a net benefit for biodiversity.

There is a very real disconnect between the ambitions of the Welsh Government and the Senedd for the Levels and the reality of the DNS planning process within PEDW. Our experience, drawn from being objectors, and appearing at DNS Hearings is that the big picture of protecting and enhancing this NNRMA does not appear to be shared by all major stakeholders or PEDW. Each application is considered in isolation, with no consideration of cumulative impacts, and there has been no attempt at all to learn from the results of post-construction monitoring in respect of constructed solar development such as the Llanwern example cited above. Without the urgent intervention of Welsh Government in the form of a temporary halt, there is a real possibility that all the excellent work set out in Future Wales in relation to the Gwent Levels NNRMA will come to nothing.

In any event, conditions cannot be significantly adjusted to take account of the damage that results from solar development; realistically, no enforcement action would result in the removal of the development and the reinstatement of the SSSI - once it's gone it's gone.

This is a very grim picture indeed, especially when one takes into account the “shifting baseline” phenomenon. NRW estimates that between 1993 and 2014, 28% of the Rhymney and Peterstone SSSI alone (one of the constituent SSSIs of the composite Gwent Levels SSSI) was destroyed by development.

The situation is now urgent; we are faced with the immediate likelihood that at least another 200 hectares of SSSI would be lost via the Rush Wall and Wentlooge solar applications (using broadly the same mitigation measures and conditions as those for Llanwern) in addition to the 95 hectares of Llanwern solar. Further, another at least 52 hectares are in the consent pipeline (Magor Solar Farm), which would also be lost in due course. Only last week we heard of yet another enormous scheme on the SSSI, near the Newport Wetlands Nature Reserve, which is at the early stages of the consent process.

We are aware that a substantial proportion of all of the Levels’ farming community on the SSSI are regularly approached by developers with a view to promoting major solar development on their land. Every consented solar farm on the SSSI would trigger further waves of approaches to the farming community of the SSSI on the part of developers, and thus further applications.

Every new consent for solar projects would add to the probability that further projects would be consented, in a positive feedback loop due to precedent and momentum. The developers of the Wentlooge resubmission application have included a KC's legal opinion with their application; the opinion states that the previous Inspector's recommendation of approval in respect of the first Wentlooge application, in conjunction with the approval and construction of the Llanwern solar farm, have established a precedent which dictates that any Ministerial decision not to approve the Wentlooge scheme would be vulnerable to legal challenge.

Given the determination of the renewable energy industry to exploit the economic advantages which sites on the Levels offer them, it is therefore not hyperbole to envisage that without some definitive action such as a temporary halt to major development, and under present arrangements, in the next 5-10 years we will see the complete transformation of this extraordinary environment into an energy park. Wales is one of the most nature-depleted countries in the world, and we all want the Gwent Levels to be a place where declines are reversed.

A Positive Future for the Levels:

The relentless pressure which the Levels are facing stands in stark contrast to the excellent work you and your Welsh Government and Senedd colleagues have been carrying out over the last few years, in conjunction with the charity sector, the Gwent Levels Working Group and local communities the length and breadth of the Levels. Your Ministerial Statements have had a real and lasting impact on momentum and direction of travel, whilst the Living Levels Partnership is a Wales-wide exemplar of cohesive work to achieve shared aims. The Gwent Levels National Natural Resource Management Area (NNRMA) delineation pursuant to Policy 9 of Future Wales, and your stated intention that a masterplan for the Levels is produced and adopted, are real ground breakers. All this work demonstrates what we in Wales can achieve in pursuit of the sustainable management of natural resources (SMNR) on a landscape scale.

Your Ministerial Statement concerning the results of the Biodiversity Deep Dive released last week is very timely, and we welcome the fact that it highlights the Gwent Levels as being specifically worthy of protection, and commits the Welsh Government to an enhanced level of protection for SSSIs via a review of Planning Policy Wales 11.

We therefore respectfully repeat our call for a halt on major development on the Gwent Levels. The halt we seek would be temporary in nature, but we believe it is necessary for the meaningful completion of the NNRMA work pursuant to Policy 9 of Future Wales, including the spatial masterplan and a comprehensive post-construction monitoring project.

As a result of this halt, we are hopeful that the big picture of a more positive future for the Gwent Levels NNRMA can be shared by all stakeholders working with a common purpose to protect and enhance this unique place in Wales.

Yn gywir iawn,

[redacted]

(Joint chairs, FOGL) (CEO Gwent Wildlife Trust)

Friends of The Gwent Levels

Ymddiriedolaeth Natur Gwent Wildlife Trust