An analysis of the Potterne Park Farm Solar Development 'Construction Traffic Management Plan'.

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Executive Summary

Significant elements of this report have been cut and paste from a previous application prepared in Uttoxeter by a different company for a much smaller solar farm. The original document was prepared for a 20MW farm over 45ha whereas PPF solar is nearly double that (79Ha). However, Hydrock (on behalf of Lighthouse) have come to the conclusion that the load calculations are exactly the same. Hydrock have also previous presented the same data and conclusions in Wales in support of a 32Ha farm in the Vale of Glamorgan. As a highlight of the plagiarism of this work I draw your attention to the anticipated load moves for each site which have been presented to you as 'based on the applicant's experience'. These state that the same number of loads are required to build a 32Ha far, a 79Ha farm and a 45Ha farm. Furthermore, in Wiltshire Council's response to the initial application the planning officer stated: I am interested to find out more from the applicant why they believe their site does not mirror this [other comparable sites] demand [for vehicle movements]'. It is my opinion that this report is an industry standard cut and paste and entirely wrong for the application. Cutting and pasting traffic movement data from previous applications amounts to plagiarism and fails to address the Planning Officer concern over 'the effect this volume and size of traffic will have on the aesthetic and functionality of the highway'. Noting the plagiarised estimates above there is no way the Planning Officer can determine this from the current document.

The following applications have been plagiarised to prepare this report:

Serial	Application	Location	Date	Remarks
1	Brynwell Farm 32Ha	Vale of Glamorgan	2021	Section 5 of this document is exactly the same as PPF application.
2	Aston House Farm, nr Uttoxeter	Uttoxeter	2014	Table 4.1 and section are the same as the PPF application.

This is a poorly prepared report that asks more questions than it answers, and I would strongly urge Wiltshire Council to reject it as incomplete, contradictory, and misleading. There are glaring omissions to the works statements, in particular Table 5.1 which gives details of the proposed moves to and from site. Based on the calculations in this report these have been under reported by at least 73%, it is more likely that there will be in the region of 1800 HGV movements to and from site over the construction period. This does not include the daily

commute for the assumed 40 workforce which would add significant daily traffic to a single lane route. The construction period itself is highly improbable, 30 working days of in loads would bring a bow wave of equipment to site which could not be dealt with by the mechanical handling equipment stated, at peak the single loader would need to offload a HGV every 7 minutes during working hours. There has not been any ground investigation, and this means that the amount of ground works required is unknown, however based in the clay construction is highly unlikely that small amount of aggregate accounted for would be sufficient. In terms of access, no onsite survey has been carried out. In particular, the bridge on the access route has not been assessed, leading to a recommendation for a temporary bridge if required. The advised temporary bridge could not be used by the public and therefore, if installed, the route would likely be closed to the public whilst it was in place. As the final access to site is a single lane traffic management would be required stopping HGVs on Potterne Wick causing HGVs to come to a standstill on a 60mph route. At best this report is a shabby cut and paste, at worse it is a deliberate attempt to downplay the construction impact.

Methodology

The author does not have access to the detailed plans for the solar farm and so has had to make some assumptions where the designs supplied are incomplete, wrong or make omission. Furthermore, it appears that the detailed ground investigations required to make an accurate estimate of construction and loads has not yet been done. This means that a detailed design cannot be done. Where factors have had to be estimated in this report, a conservative value has been added based on experience and detailed knowledge of the local area.

Calculating the amount of equipment required for Potterne Park Solar Park.

The peak operating capacity of the Farm is stated as 49.9Mw expressed as 49000000w. The average single panel has a capacity of 400w. Therefore at 100% efficiency 122500 panels required. But assume 80% efficiency for a N facing panel and therefore 147000 required. Assume panels are 20kg due to manual handling regulations. Therefore, the total mass of solar panels is: 294000kg or 294 tonnes. Assume a Truck fully loaded can carry 20t therefore 14.7 loads, rounded to 15.

However, if we assume panels are 150*100*6 cm (Design states length of panel is 6.6m i.e. 4 panels with space for fixing/ maintenance). This gives a volume of 0.1053m3. A 40t Articulated truck has a load volume of 91.06m3 so assuming 20% inefficiency for pallets etc each lorry can carry 864 panels at maximum load.

If 147000 panels are required, then 170.13 loads would be required for panels, rounded to 171 loads at maximum efficiency. It is possible (likely) that the trucks won't be loaded to peak efficiency due to shipping constraints and therefore the number of loads would increase. The construction statement also cites two types of vehicles, 40t Articulated and 20t rigid. Note the calculations above are based on a 40t Articulated vehicle internal load space. It would be difficult to speculate on the load configurations without understanding the supply chain for these panels. E.g. they might be shipped direct from an overseas supplier and therefore arrive straight to site in a shipping container. In this case the load efficiency would be reduced by 18% as the container would have an internal volume of 67m3 as opposed to the 81m3 in an articulated lorry. Therefore, it is possible that 200 shipping containers would be required. It is

also possible that the container would have to be off loaded and reloaded therefore increasing the time to unload or increasing the number of journeys.

Panel frames.

Assume panels are laid in rows of 4 side by side. Then the total M of solar panels would be 36750m. Assume there is a 1m frame interval then the steel required would be 36750 * 4 vertical frames and 36750 * 2 horizontal steel. Therefore, total steel frame around panels would be 220500m of frame.

Assume the panels would be supported by two uprights every 2 m throughout the 36750m then 18375 pairs of uprights would be required. Assume they need to be 1m into the ground and protrude 3.2m from the ground at one end and 2.2m at the other then 5.4m of steel would be required. Therefore, a further 101062m of steel required.

Assume an additional factor of 0.1 for waste and 0.1 for fixings etc then 341775m of steel required. Assume steel is 0.004m*0.004m box then total volume of steel would be 546.84m3 of steel. The mass of 1cm3 of steel is 7850kg so each lorry can carry 2.5 m3 of steel. Therefore 218 lorries would be required in mass terms alone. This would assume that the steel is in volumes that would allow it to be packed in such a way. As it would come in prefab shapes the actual packing volume might be different.

Fencing

This is not accounted for in the calculations given but assume a fence around the outside of the 200 acres. The perimeter could be expressed as $\sqrt[4]{}$area. One acre is 4046m2 therefore 200 is 809371m2. Therefore, 3959m of fencing would be required. However, as the perimeter isn't a neat square an approximately 10% should be added. Additionally further fencing would be required due to footpaths etc. From the plans this is estimated at 2km. Therefore a total of (3959+390+2000) would be required, total 6349m. The design is given as a 2m fence with posts at 5m intervals. Therefore a further 1269 posts would be required. A 50m roll of fence weighs approximately 95kg and so the total mass would be, (95x6349)/50=120631kg or 12 tonnes. However, in terms of volume 127 rolls of fence would be required. This loaded volume could be calculated at 0.40m*2m, total 101m3. The internal volume of a 13m articulated lorry would transport this in a single full load, if all the fencing were delivered to site in one lift. Owing to the high value of this material and its attractiveness to theft it is more likely that the fencing would be delivered in stages. Assume 4. If we assume 1m of fence post is 1kg and that the posts are 3m then the total mass of posts would be: 3807kg or 4tonnes.

Material imports/ exports Calculations.

Assume all ground improvements must be done to 1m depth due to unknown ground conditions. The sub station size is given as 45m (stated) and 80m (measured from shoddy plan). Therefore, the area construction for this is 3600m2 * 1m depth gives 3600m3. Assume a compaction factor of 1.2 therefore 4320m3 of aggregate required. Para 5.12 states a 15m3 lorry then 282 loads required. Para 5.11 gives 1800m of track improvement required citing the need for a further 1000m3 of stone. Assume width of 3m this would add 0.18m aggregate but only 014 upon compaction. Assume 0.3m would be more likely then the aggregate import is likely to be 2000m3. Depending on ground conditions it is unlikely that this would be sufficient to support routine trafficking. As we know the ground is clay the effect of dumping aggregate

on the ground is unlikely to work. Para 4.4 further states a HGV holding area in a field, the ground conditions are unknown. HGVs cannot drive on unprepared ground without a significant risk of becoming stuck. Therefore, additional tracks would need to be conducted. These have not been accounted for but could be assumed to have an equal requirement to the track improvements. Para 4.4 states that these constructions will be temporary and therefore any aggregate imported would need to be exported again, this has not been accounted for.

Activity	Type of Vehicle from table 5.1	Claimed Deliveries from table 5.1	Calculated Deliveries
Solar Panels and mountings	16,5m Artic	115 (230 two way movements)	170+218= 388 (777 two way journeys)
Ground reinforcement	20m rigid tipper	67	416 (832 two way journeys)
Removing ground reinforcement	20m rigid tipper	0	67
Concrete pouring	Not stated assume 8m lorry.	0	20
Fencing	Not stated. Assume 10m lorry	0	4
General	JCB	1	4 including crane, telehandlers and excavator.
Total		245	902 single journeys or 1804 return journeys.

Construction Methodology.

The document states that a single JCB would be required. This is unlikely due to several factors. Firstly, the JCB is likely to only have a load capacity of 4t, this would be insufficient to off load the inverters and other large equipment. Secondly a single JCB would be insufficient to simultaneously load and unload deliveries to site, whilst construction was carried out, especially at the proposed frequency of in loads. Furthermore, the construction of the base for the substation has been completely omitted. The use of a JCB for this task is unlikely to be sufficient.

Access

Para 4.8.2 discussed the small bridge that construction traffic will have to cross. It states 'there are no obvious weight restrictions along the unclassified road therefore this will need to be reviewed.' If improvement is required the document suggests using a bridge 'suitable for private locations'. As this is not a private location further work would need to be done to ascertain if it is suitable for a road. Furthermore, the suggested bridge is for bridging 'virgin gaps'. I.e. where

no bridge exists. This is not appropriate for this location unless a new bridge area is built adjacent to the existing bridge. Instead, an over bridge would be more appropriate for this task. From a look online I cannot find a road legal overbridge meaning that it would be likely that the road would need to be closed to traffic whilst the bridge was in place.

The report states that verges etc will be protected using matting, however this will not protect the overhead cable pylons that are already in poor condition. See photo. Many of the pylons in this area already show signs of listing, probably due to ground conditions. Driving HGVs so close to them is likely to damage them further.

The track shown below also does not have suitable passing places and therefore a traffic management system would need to be put in place with a suitable holding area.

Figure 1- View of road leading to Potterne Park Farm.