

## APPENDIX 3

### Drainage Strategy Response

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## SUNNY OAKS RENEWABLE ENERGY PARK, WHITERAILS ROAD, WOOTTON, ISLE OF WIGHT. – FLOOD & SURFACE WATER DRAINAGE.

### Introduction

1. This brief statement summarises the work and further consultation undertaken since notification that the approved planning application, referenced 22/01585/FUL (Approved April 2024), reverted to 'pending' status due to a judicial review process.
2. This planning submission was previously approved, subject to conditions, following in-processing discussions with the Lead Local Flood Authority's (LLFA) Drainage Engineer, Mr Neil Youngs, in terms of flood risk and surface water drainage matters. Due to the judicial review (JR) process and the introduction of the Isle of Wight Council's Sustainable Urban Drainage Systems (SuDS) Supplementary Planning Guidance (SPG), adopted following the previous granting of consent in May 2024, the Council asked that, in the absence of Mr Youngs, its external drainage consultant, JBA Consulting Ltd, provide a formal comment on the proposals.
3. On the 10<sup>th</sup> July 2024, JBA commented with their consideration of the Sunny Oaks Renewable Energy Park in relation to the SUDS SPG (Appendix A). Accordingly, the Applicant submitted a response to JBA on the 5<sup>th</sup> August 2024 (Appendix B), with a further response provided by JBA on 4<sup>th</sup> September 2024 (Appendix C). This document is intended as a final statement, following JBA Consulting's most recent comment.
4. The documents supplied to the Isle of Wight Council Local Planning Authority and the Lead Local Flood Authority (also Isle of Wight Council) and, by proxy, their consultants JBA Consulting, are as listed below:
  - Pre-application Statement Flood and Surface Water Drainage Matters (August 2024, Mayer Brown Limited)
  - Hydrologic Response of Solar Farms (May 2013, Lauren M. Cook and Richard H. McCuen, Journal of Hydrologic Engineering)
  - Greenfield Runoff Calculations (15/07/2024, Mayer Brown Limited)
  - MicroDrainage Calculations (15/07/2024, Mayer Brown Limited)
  - Landscape and Visual Impact Assessment (31.08.2022, o30landscape)
  - Sunny Oak Conceptual Design (17432\_LAY\_1000 Revision E, 16/08/2022, Natural Power Consultants Ltd.)
  - Flood Risk Assessment & Drainage Strategy (August 2022, Mayer Brown Limited)
  - Indicative Interception Ditch Alignment (March 2023, Ridge Clean Energy Ltd.)
  - EA Flood Zone Extents (25978/4 rev P01, 19/08/2022, Mayer Brown Limited)
  - Addendum to Flood Risk Assessment & Drainage Strategy (February 2023, Mayer Brown Limited)
  - Proposed Battery and Substation Compound Plan (SK001, 03/02/2022, Ridge Clean Energy Ltd.)
  - Proposed BESS Substation Details (SK010, 31/08/2022, Ridge Clean Energy Ltd.)

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- Design & Access Statement (2224-9963, August 2022, BCM)
5. As a result of the submission of these documents, via the planning application process and subsequent consultations, the LPA / LLFA's position is now as follows:
- The findings of research paper, 'Hydrologic Response of Solar Farms' by Cook & McCuen, 2023, have been accepted by the LLFA/JBA. They have stated that, '...it can be demonstrated that the solar panels are likely to have a negligible impact on the surface water run off generated by the site,..'.
  - They conclude that the largest impact to surface water runoff is ground cover. The proposed ground cover, consisting of wildflower meadow and specific rich grass, is considered to address this.
  - Further details are required in terms of the construction of the maintenance tracks, to ensure that the current permeability is retained.
  - It references the use of the interception ditch, previously requested / agreed by the LLFA and requests details of dimensions (supplied), storage capacity (supplied), connection to the watercourse and discharge rate (supplied).
  - In terms of the Battery Energy Storage System (BESS), they note that the system will store water for firefighting purposes, however further details are requested, including plans, calculations and exceedance methodologies.
  - In the event of a fire, to prevent contained water reaching the watercourse or groundwater details of pollution prevention measures and design details, including calculations, shall be submitted.
  - Future maintenance details are also requested, for the surface water drainage systems serving the site both during construction and for perpetuity.
6. As we have previously stated, the most recent comments are based on guidance adopted in May 2024, which neither the LPA, LLFA or the client design team could possibly have considered when this application was approved in April 2024 or during the preceding design and assessment stage.
7. Notwithstanding this, having reviewed the information that is considered to be outstanding, it is our conclusion that, with some minor points of clarification and sight of additional drainage proposals, the required information could all be secured by the imposition of suitably worded planning conditions imposed on a replacement consent.
8. The aforementioned research paper identifies that with well-maintained grass under/around the panels, solar panels themselves do not have a significant impact on total volumes or the runoff or peak discharge rates (0.35%) and thus no further surface water management techniques are generally required. It also determined that ground where water sheds off panels should be sealed by a vegetated cover, to prevent erosion. This has been accepted by JBA / LLFA, which was the main area of concern.

9. The maintenance tracks will be constructed using permeable construction, so this will of course not utilise hoggins, gravel and/or compacted Type 1. We are happy to accept a condition that states that permeable materials, such as Type 3, will be used, taking advantage of the voids created by its angular stone and lack of fines content to allow continued permeability. The requirement for calculations and permeability testing again appears overt, considering the findings of the research paper, where only a 0.35% increase in run off rates has been acknowledged and agreed, as well as the previous approval. However, if considered strictly necessary, this of course could be included in an appropriately worded condition and requested at condition compliance stage, as is the norm.
10. In a similar vein, the requirement for details of the interception ditch appears to have been made in absence of detail already submitted, which includes storage capacity, calculations and dimensions. One point of clarification is that the proposal for the interception ditch may have been misconstrued, as the JBA comment refers to a requirement for details of the connection to the watercourse. As in the previously approved iteration of this proposal, there is no proposal or possibility of a connection to Palmers Brook, as direct access to it is outside of the site boundary. However, again bearing in mind the limited 0.35% maximum increase in run off rates resulting from the proposal, the calculations which accompanied our August 2024 submission conclusively demonstrated that sufficient storage is available within the proposed ditch, whilst retaining a run off rate of only 156.3 l/s, which is the existing greenfield run off rate, or QBAR rate, for the site as a whole in its existing condition, with no outfall. For clarity then, surface water will continue to drain as it does, via overland flow and infiltration, at the same rate it currently does. With these principles agreed and accepted, as they have been in JBA's written comment, we would be happy to provide detail in this regard, via the imposition of an appropriately worded planning condition.
11. In terms of the BESS proposals, an updated BESS layout plan is attached, which has been submitted as a standalone appendix to the revised Planning Statement, as well as being embedded within the new Outline Battery Safety Management Plan (also appended to the revised Planning Statement). As referenced in the JBA comment, water tanks to hold firefighting water will be installed to accord with National Fire Chief Council (NFCC) specifications but aren't currently shown, however will be secured by way of planning condition. To confirm, it is not the intention to collect and store rainwater for re-use in the event of a fire
12. However, to ensure the Council is comfortable in imposing such a condition, the BESS drainage plans also now include outline details of:
  - the drains across the compound to catch either rain or fire water,
  - the new underground pipe to the north running to A – underground attenuation tanks (to store potentially contaminated fire fighting run off) and/or B – appropriately sized underground soak away (to discharge rainwater under normal operating conditions).
  - This will be controlled by a penstock, left open so rain fall goes to the soak away (discharge at green field run off rates), or closed in a fire fighting event to capture fire water run-off.
  - Because of the need to capture and store fire run off, the compound will be impermeable.

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- The access entrance has been widened just outside of the compound, allowing an appropriate access/egress for a fire appliance.
  - New emergency pedestrian access to allow fire fighters into the compound from different entrances.
  - New emergency pedestrian footpaths to allow access to the new entrances
13. With this in mind, again, we consider that the requested details, in terms of specific calculations and firewater management measures, can be covered by the imposition of an appropriately worded condition following detailed design. Final infrastructure on site will be dependent on availability at the time, following planning consent and it is therefore considered proportionate to require such detailed specifications at the detailed design stage. It is also of note that the Applicant has agreed the amendments to the BESS compound with the Hampshire and Isle of Wight Fire and Rescue Service (see the accompanying outline Battery Safety Management Plan).
14. Finally, in terms of details for the management and maintenance of surface water runoff, both during construction and site operation, as the base principles have been shown to be acceptable and workable, again, an appropriately worded planning condition could secure the required information.
15. As before, for the above reasons, it remains the considered opinion of Mayer Brown and the Sunny Oaks Energy Park Design & Planning Team that there are no sustainable flood risk/surface water drainage related reasons why the LLFA's previous stance in relation to the proposed development should not be maintained.
16. Any information that may considered to be outstanding at this juncture is detailed information that, in all other situations, would be secured via the imposition of planning conditions, in the normal manner.

Gavin Toogood EngTech FIHE MCIHT  
October 2024.

**APPENDIX A: JBA / IWC LLFA 10<sup>TH</sup> July 2024 Comment**

Ann Braid  
Isle of Wight Council  
Seaclose Offices  
Fairlee Road  
NEWPORT  
Isle of Wight  
PO30 2QS

10<sup>th</sup> July 2024

Dear Ann Braid,

**Planning Reference:** 22/01585/FUL

**Proposal:** Proposed renewable energy park - consisting of ground mounted solar arrays, battery energy storage system, substation building, ancillary infrastructure, means of access and associated landscaping

**Address:** Land to the Northwest of Whiterails Road/west of Park Road + Land to the Southeast of Whiterails Road/west of Briddlesford Road, Wootton, Isle of Wight

**Lead Local Flood Authority recommendation:**

<b>Request submission of additional information</b>	The information provided is insufficient to demonstrate that flood risk and surface water drainage will be managed effectively. The LLFA requests that the applicant provides the information outlined in this letter.
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**Documents Reviewed:**

- Sunny Oak Conceptual Design (17432\_LAY\_1000 Revision E, 16/08/2022, Natural Power Consultants Ltd.)
- Flood Risk Assessment & Drainage Strategy (August 2022, Mayer Brown)
- Indicative Interception Ditch Alignment (March 2023, Ridge Clean Energy Ltd.)
- EA Flood Zone Extents (25978/4 rev P01, 19/08/2022, Mayer Brown)
- Addendum to Flood Risk Assessment & Drainage Strategy (February 2023, Mayer Brown)
- Proposed Battery and Substation Compound Plan (SK001, 03/02/2022, Ridge Clean Energy Ltd.)
- Proposed BESS Substation Details (SK010, 31/08/2022, Ridge Clean Energy Ltd.)
- Design & Access Statement (2224-9963, August 2022, BCM)

## **Description of site flood risk**

### *Surface Water*

The long term flood risk from surface water mapping provided by the Environment Agency shows that the majority of the site is at very low risk of flooding from surface water, however, there are a number of flow routes through the site. During the 1 in 30 year and 1 in 100 year rainfall events, the northern and western boundaries of the site are at risk of surface water flooding, with anticipated depths of up to 30cm. The area in the north-west corner of the site has estimated depths of 90cm.

There are two flow routes for the 1 in 30 year rainfall, one across the field to the north of Whiterails Road and the other to the south of Whiterails Road, flowing across the proposed access road for the Battery and Substation Compound, which is associated with an ordinary watercourse. For the 1 in 100 year rainfall event, the flow routes across the site become more defined, flowing east to west with depths of up to 30cm.

The mapping shows additional areas at surface water flood risk for the 1 in 1000 year rainfall event. The northern area of the site, west of Park Road is shown to have two flow routes both flowing north-west across the field, joining the existing flow route across the northern boundary. One of these flow routes appears to originate from Park Road and the other one from fields south of this area, both have anticipated depths of up to 30cm. In the area of the site north of Whiterails Road, there are isolated areas which are shown to be at flood risk, it is assumed that this is due to localised topographical low points which allow for runoff to collect. For the 1 in 100 year rainfall event there is an additional flow route across the access road for the Battery and Substation Compound, with predicted depths of 30cm.

It should also be noted that there are two defined ordinary watercourses within the site boundary, which at this stage have not been taken into consideration in the design of this site. The Flood Risk Assessment & Drainage Strategy must be updated to account for these features and explain how the proposed development may impact them. Please also see the informative at the end of this letter regarding Land Drainage Consent.

### *Groundwater*

Groundwater Flood Map (Jeremy Benn Associates, 2016) shows the groundwater level in the area of the proposed development to be below 5m of the ground surface for a 1 in 100 year return period. This means that flooding from groundwater is not likely.

### *Fluvial*

The flood map for planning produced by the Environment Agency shows that the western boundary of the site is within flood zone 3 and is therefore at high risk from fluvial flooding, this is flooding associated with Palmer's Brook. The remainder of the site is shown to be in flood zone 1 and is at low risk of flooding from fluvial sources.



### Technical review of proposed surface water drainage scheme

We have undertaken a technical review of the information provided by the applicant and have provided comments below in line with the Isle of Wight Sustainable Drainage Supplementary Planning Document (SPD).

The Flood Risk Assessment & Drainage Strategy states that the solar panels will not increase rate or volume of runoff and therefore a surface water drainage scheme is not required. It should be noted that rainfall from solar panels can concentrate runoff and create channelised flows which may erode soils, which in turn will allow for a greater rate and volume of runoff to enter watercourses compared to the greenfield conditions. This risk has not been accounted for or mitigated in the drainage strategy.

An Indicative Interception Ditch Alignment (March 2023, Ridge Clean Energy Ltd.) drawing was submitted to support the proposed planning application, but there is no explanation of this feature. It has therefore been assumed that an interception ditch has been proposed to capture runoff from the solar panels. There are concerns that this interception ditch has been proposed in a location that it is in flood zone 2 and 3, as well as being at medium risk of surface water flooding, as this would mean that during times of flooding the ditch would be inundated with flood water. Further information regarding this feature is required, including details of feature, discharge rates and volumes and calculations to demonstrate it is sufficiently sized, for further information about what information is required please see table below.

The Sunny Oak Conceptual Design (17432\_LAY\_1000 Revision E, 16/08/2022, Natural Power Consultants Ltd.) shows maintenance tracks throughout the areas of proposed solar panels, no information regarding the construction of these tracks has been provided. If the proposed maintenance tracks are to be constructed with an impermeable construction, this must be accounted for within a surface water drainage system.

The BESS (Battery Energy Storage System) and substation has a proposed building and areas of impermeable hardstanding, therefore there will be an increase in surface water runoff generated from this area of the development. Section 3.12 of the Flood Risk Assessment & Drainage Strategy states that the access track will be constructed with permeable surfacing, however no details of the surfacing has been provided. A surface water drainage system for this area must be provided to comply with paragraph 173 of the National Planning Policy Framework (2021) and demonstrate that flood risk is not increased elsewhere.

SPD Standard	Standard Met?	Comments
1a: Discharge must be prioritised according to the following discharge hierarchy:	No	No surface water drainage scheme proposed.  The proposed surface water drainage scheme must follow the drainage hierarchy as set out

<p>a. Rainwater re-use and recycling b. Shallow infiltration c. Discharge to surface water body (watercourse, lake, sea) d. Discharge to surface water sewer e. Discharge to combined sewer network</p>		<p>in Standard 1a of the Isle of Wight Sustainable Drainage Systems Supplementary Planning Document (May 2024).</p>
<p>1b: the peak allowable discharge rate from the development to any surface water body or sewer for the 1 in 1-year, 1 in 30-year and 1 in 100-year rainfall event must never exceed the peak greenfield runoff rate for the same event.</p>	<p>No</p>	<p>No calculations have been provided to demonstrate that there will not be an increase in runoff rates from the proposed solar farm.</p>
<p>1c: For all developments, the runoff volume from the development to any surface water body or sewer in the 1 in 100-year, 6-hour rainfall event must never exceed the greenfield runoff volume for the same event (with an allowance for future climate change and urban creep).</p>	<p>No</p>	<p>No calculations have been provided to demonstrate that there will not be an increase in runoff volume from the proposed solar farm.</p>
<p>1d: The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30-year rainfall event. Any flooding within a 1 in 100-year plus climate change rainfall event must be retained within the site boundary, and no flooding occurs in any part to any building or utility plant within the development.</p>	<p>No</p>	<p>No calculations have been submitted in support of this planning application.</p>
<p>1e: Flows resulting from rainfall in excess of a 1 in 100 year plus climate change rainfall event, OR from overtopping or failure of a SuDS feature, must be managed in downstream SuDS components or designated exceedance routes that minimise the risks to people and property.</p>	<p>No</p>	<p>As no calculations have been submitted to support this planning application, it cannot be determined how surface water runoff above the 1 in 100 plus 45% climate change allowance will affect the site and surrounding areas.</p>

<i>2a: SuDS must prevent runoff from leaving the site during everyday rainfall events (up to 5mm).</i>	No	No surface water drainage proposed.
<i>2b: A SuDS management train approach must be followed to ensure that surface water discharged does not adversely impact the quality of receiving waters.</i>	No	No surface water drainage proposed.
<i>3a: SuDS designs must maximise the use of vegetated SuDS features for storage and conveyance across the site.</i>	No	No surface water drainage proposed.
<i>3b: SuDS designs must contribute to meeting local and national policy on biodiversity.</i>	No	No surface water drainage proposed.
<i>4a: SuDS designs must maximise multi-functional use of space on the site.</i>	N/A	No surface water drainage proposed. Although due nature of the development multi-functional SuDS are not required.
<i>4b: SuDS must be safe for residents and operators.</i>	No	No surface water drainage proposed.
<i>5a: SuDS designs must contribute to ensuring new developments are resilient to climate change for the lifetime of the development.</i>	No	No surface water drainage proposed.
<i>6a: SuDS designs must not exacerbate coastal erosion or landsliding or have an adverse effect upon the stability of cliffs or areas of known ground instability on the Isle of Wight.</i>	N/A	Development is not at the coast and no infiltration features are proposed.
<i>7a: SuDS must be adopted and maintained for the lifetime of the development.</i>	No	No surface water drainage system has been proposed and therefore no information about the management and maintenance of a system has been provided.
<i>7b: Surface water runoff must be managed during the construction phase.</i>	No	No information relating to how surface water runoff will be managed during the construction phase has been provided.

#### **Further information required**

The LLFA requests that the applicant provides an updated Flood Risk Assessment & Drainage Strategy for both sections of the site, the solar panels & maintenance tracks and the BESS and substation, the following information in accordance with the [Sustainable Drainage Systems SPD](#). The following information is required:

- Details of the existing ordinary watercourse on site and how the proposed development may impact them
- Demonstration that the drainage hierarchy has been followed
- Location of surface water drainage components outside of current flood risk areas
- Greenfield runoff calculations
- Calculations to demonstrate that the proposed development does not increase runoff rates or volumes and does not flood during the 1 in 30 year rainfall event, and that the 1 in 100 year rainfall event plus 45% climate change allowance does not leave the site
- Details of the water quality and biodiversity benefits of the proposed surface water drainage scheme
- Details of the management and maintenance of the surface water drainage
- Details of how surface water runoff will be managed during construction

#### **Informative**

##### *Land Drainage Consent*

Under the terms of the Land Drainage Act 1991 and the Floods and Water Management Act 2010, the prior consent of the Lead Local Flood Authority is required for any proposed works or structures in the ordinary watercourse. Land Drainage Consent must be applied for and granted by LLFA before works to the ordinary watercourse can be undertaken. Information and the application form can be found on the Isle of Wight Council website. Please be aware that this process can take up to two months.

Yours sincerely

Luke Virgo

Principal Engineer (JBA Consulting on behalf of the Lead Local Flood Authority)

**APPENDIX B: Mayer Brown Response 5th August 2024**

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**SUNNY OAKS RENEWABLE ENERGY PARK, WHITERAILS ROAD, WOOTTON, ISLE OF WIGHT. – PRE-APPLICATION STATEMENT FLOOD & SURFACE WATER DRAINAGE MATTERS.**

**Introduction**

1. This statement responds to comments made by the Isle of Wight Council (IOWC) / JBA Consulting, acting as Lead Local Flood Authority (LLFA), dated the 10<sup>th</sup> of July 2024, with reference to the above site (application reference 22/01585/FUL). Whilst planning consent was received in April 2024, it is understood that the application is soon to revert to 'pending' status. The LLFA comments were received pursuant to the IOWCs adoption of a Supplementary Planning Document (SPD) on Sustainable Drainage Systems which became a material consideration on the 23<sup>rd</sup> of May 2024. This document concerns itself with surface water drainage / flood risk matters.
2. The overarching / summary comment is as shown below:  
  
*'The information provided is insufficient to demonstrate that flood risk and surface water drainage will be managed effectively. The LLFA requests that the applicant provides the information outlined in this letter.'*
3. We are satisfied that the site would be suitably drained and that our previously submitted work remains valid. It is also noteworthy that this most recent comment makes no reference to the in-processing negotiations and discussions which took place with Mr Neil Youngs, previously the Lead Local Flood Officer for the LLFA. Two main issues are worthy of specific note at the outset:
  - (1) This most recent comment is based on guidance adopted in May 2024, which neither the LPA, LLFA or the client design team could have taken into account when this application was approved in April 2024 or during the preceding design and assessment stage; and
  - (2) The grid/table included in the LLFA comment refers to a lack of calculations without consideration being given to the previous negotiations and agreements with the previous LLFO, which clearly explained matters and which were accepted.
4. It is also worthy of note that in this response we refer to scientific research that specifically examines the hydrological impact of a development of solar arrays. The paper is entitled the 'Hydrologic Response of Solar Farm' by Cook & McCuen, 2023'. Whilst this paper is American, in terms of its acceptability in the United Kingdom, it formed the basis of the RPS Groups Flood Risk Assessment and Sustainable Drainage Strategy for the approved 2022 application for a Solar Farm at Stansted Airport. It has also been accepted locally, by the Isle of Wight Council and, as such, the LLFA, during the processing of the condition compliance application referenced 24/00155/DIS.
5. The paper identifies that with well-maintained grass under/around the panels, solar panels themselves do not have a significant effect on total volumes or the runoff or peak discharge rates (0.35%) and thus is not generally sufficient to require surface water management techniques. It also determined that ground where water sheds off panels should be sealed by a vegetated cover, to prevent erosion. The proposed development, as submitted, proposes substantial new planting in and around the solar panels, including wildflower seed mixes along with both enhanced and new scrub, hedge and tree planting, as identified on Figure 13 and maintained by Appendix F to the submitted Landscape and Visual Appraisal (to be secured by planning condition). The measures have been assessed as providing a substantial biodiversity net gain, with no objections received by

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the County Ecologist, Arboricultural Officer or Natural England. This is considered to prevent channelised flows and sediment erosion. The study does suggest that where bare ground or gravel is considered around panels (not the case at this proposed development), surface water management is required, such as the simple addition of a buffer strip. Despite the proposed development securing high level of vegetation cover as described above, for significant lengths of the solar array there is a 20m buffer strip between panels and field edges, adding further robustness to the site design and compliance with the study's recommendation of good practice.

6. With the figure of 0.35% in mind (and not taking account of the separation between panels and field edges), we have considered various ways of satisfying the new requirement for calculations. Ordinarily, we would use Microdrainage or Causeway Flow to produce calculations relating to surface water run-off, peak flow, attenuation requirements, greenfield run off rates and the like. However, this software is designed to deal with a more standardised development proposal that involves the introduction of an entirely impermeable contributing area, such as dwelling roofs, car parks, or roads, which is then compared to an existing greenfield (QBAR) or partially developed (QBAR Urban) site. Whilst adjustments can be made to allow for infiltration, the consideration of developments such as the Sunny Oaks Renewable Energy Park are not the primary focus of this software, however it has been used in absence of any specific software for this purpose and as no methodology has been put forward by the LLFA in their comments.
7. In order to further quantify the surface water drainage principles already agreed with the previous LLFO, we have considered an approach within Microdrainage to model pre and post development scenarios at the site. The first step is to establish the current run off rate, which we have done by calculating QBAR for the site north of Whiterails Road (i.e. – the site of the arrays). The site on the south side of the road is discussed further below.
8. Using the northern site area of 27.180 hectares the greenfield run off rate, or QBAR, is 156.3 l/s. A copy of these calculations accompanies this report.
9. We have taken two approaches to attempting to provide calculations, considering the new SUDS SPD, which is predominantly aimed at residential and commercial development and follows the same hierarchy used by Southern Water and Building Control.
10. Firstly, we have altered the PIMP (Percentage impermeable) parameter, within the software, for the new contributing area, to 0.35%. This is considered to be the best way of allowing the software to consider the scientifically proven minimal increase in run off rate arising from the developed array site. However, Microdrainage will not allow the rate to be reduced to that level, the lowest rate it accepts is 1 %. In the absence of an alternative methodology available or put forward by the LLFA, we have proceeded with this precautionary higher rate, acknowledging that this option is approximately three times that which is required and thus constitutes a substantially conservative approach.
11. We have created a limited piped network, broadly aping the proposed drainage layout, to allow Microdrainage to consider this. It features two 500mm diameter pipes and a flow control. The two 300-metre-long pipes approximately represent the proposed passive interception ditch as part of the scheme design, and storage within it. The flow control is set to restrict run off to the QBAR rate. 13.5 ha of area is shown as the contributing area for each pipe. When we run this simulation, the resultant calculations state that no additional storage is needed for this increased level of run off. One slight anomaly in the data as that whilst the background data input clearly shows 13.5 ha per pipe, the results display this differently. We have tried to contact Innovyze to discuss whether there is an inbuilt limiter for the maximum CA being discharged to a pipe, and apparently there is not. However, the calculated flow rates appear to be in the ranges we'd expect, so we

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consider the modelling to be accurate. As such, the previously proposed ditch arrangement, as agreed by the previous LLFO, is acceptable and provides substantial additional storage/betterment. A paper copy of the calculation accompanies this paper, entitled, 'File SOLAR MDX V2.MDX'.

12. We have also used a second methodology to model the increased flow rate. We reset the PIMP to 100% and simply added a contributing area equivalent to 0.35% of the total area. Again, this works acceptably and is shown in the paper copy of the calculations entitled, 'File SOLAR MDX V3 SET IMP AREA.MDX'.
13. Taking into account the very conservative methodology applied, and the comparable results achieved from the testing of the two approaches adopted, we conclude this bespoke application of Microdrainage (to the consideration of a solar development) to be transparent, robust and defensible. In the absence of another methodology put forward by the IOWC or LLFA (which we would be more than happy to consider), we conclude that the requirement for calculations is satisfied and the 240,000 litres of subterranean surface water storage (i.e. – the covered interception ditch) previously proposed and agreed is not only adequate, but it also represents a substantial (and precautionary) over allowance / factor of safety.
14. Turning to other matters, there is reference in the comment to a low risk of flooding across the site, which we agree, though it also references flow routes through the site for surface water and the existence of ordinary watercourses, also known as ditches. Due to the open layout of the proposed arrays (maintaining the overland flow routes) and the lack of any works to the ditches, other than very minor bridged crossings resulting from the access tracks, we maintain our consideration that the development will have no detrimental impact in this regard.
15. The comment also raises the potential for channelised flows from concentrated run off associated with the arrays causing soil erosion. However, as explained in details above, we consider that this is mitigated by the planting proposed within Figure 13 of the submitted Landscape and Visual Impact Appraisal, as would be maintained through the commitments made in Appendix F to the same document and secured by way of planning condition.
16. The interception ditch's location has been raised as an issue where it intersects the FZ 2 & 3 extents associated with Palmers Brook, however, if those flood extents are realised in the future, any drainage feature for the site, which would need to be positioned on the downstream slope, would of course be inundated. Considering the very limited increase in run off rate arising from the developed site owing to the substantial planting proposals, this arrangement would not represent a significant increase or change to the predevelopment scenario, thus the proposed design is considered to remain acceptable.
17. Other than as referenced in paragraph 18 below, the access tracks serving the site are to be constructed using permeable surfacing techniques, as committed to in the submitted Planning Statement and shown in submitted Illustrative Figures SUO-002 and 003, which would be secured by way of planning condition.
18. In parallel to the consideration of the LLFA's response based on the recently adopted SPD, the Applicant is also in discussion with the Hampshire and Isle of Wight Fire and Rescue Service about the National Fire Chief Council guidance which, similarly to the SUDS SPD, became a material consideration after the design and submission of the proposed development. To capture and retain runoff water in the unlikely event that a BESS fire is fought, the BESS and substation compound are proposed to be impermeable, with run off resulting from the firefighting process being channelled through



a series of drains to appropriately sized underground storage tanks. Under normal conditions, rainwater runoff from this area of the site would be channelled into an appropriately designed soakaway.

19. An outline Construction Environmental Management Plan (CEMP) has been submitted as part of the planning application and will be used as a basis for liaison with relevant bodies during the development of a detailed CEMP (secured by way of condition) which will effectively manage surface water during construction.
20. Considering the grid / table at the foot of the JBA Consulting document, it appears that the solar site calculation shown above, based off the findings of the Cook & McCuen paper, together with the general findings of that report and other additional clarifications, satisfactorily answers the points raised.
21. For the above reasons, it remains the considered opinion of Mayer Brown and the Sunny Oaks Energy Park Design & Planning Team that there are no sustainable flood risk/surface water drainage related reasons why the LLFA's previous stance in relation to the proposed development should not be maintained.

Gavin Toogood EngTech FIHE MCIHT  
August 2024.

DRAFT

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**APPENDIX C: JBA / IWC LLFA Response 4<sup>th</sup> September 2024**

Ann Braid  
Isle of Wight Council  
Seaclose Offices  
Fairlee Road  
NEWPORT  
Isle of Wight  
PO30 2QS

4<sup>th</sup> September 2024

Dear Ann Braid,

**Planning Reference:** 22/01585/FUL

**Proposal:** Proposed renewable energy park - consisting of ground mounted solar arrays, battery energy storage system, substation building, ancillary infrastructure, means of access and associated landscaping

**Address:** Land to the Northwest of Whiterails Road/west of Park Road + Land to the Southeast of Whiterails Road/west of Briddlesford Road, Wootton, Isle of Wight

**Lead Local Flood Authority recommendation:**

<b>Request submission of additional information</b>	The information provided is insufficient to demonstrate that flood risk and surface water drainage will be managed effectively. The LLFA requests that the applicant provides further information outlined in this letter.
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**Documents Reviewed:**

- Pre-application Statement Flood and Surface Water Drainage Matters (August 2024, Mayer Brown Limited)
- Hydrologic Response of Solar Farms (May 2013, Lauren M. Cook and Richard H. McCuen, Journal of Hydrologic Engineering)
- Greenfield Runoff Calculations (15/07/2024, Mayer Brown Limited)
- MicroDrainage Calculations (15/07/2024, Mayer Brown Limited)
- Landscape and Visual Impact Assessment (31.08.2022, o30landscape)

**Documents Previously Reviewed:**

- Sunny Oak Conceptual Design (17432\_LAY\_1000 Revision E, 16/08/2022, Natural Power Consultants Ltd.)
- Flood Risk Assessment & Drainage Strategy (August 2022, Mayer Brown Limited)
- Indicative Interception Ditch Alignment (March 2023, Ridge Clean Energy Ltd.)

- EA Flood Zone Extents (25978/4 rev P01, 19/08/2022, Mayer Brown Limited)
- Addendum to Flood Risk Assessment & Drainage Strategy (February 2023, Mayer Brown Limited)
- Proposed Battery and Substation Compound Plan (SK001, 03/02/2022, Ridge Clean Energy Ltd.)
- Proposed BESS Substation Details (SK010, 31/08/2022, Ridge Clean Energy Ltd.)
- Design & Access Statement (2224-9963, August 2022, BCM)

Having reviewed the additional information submitted by the applicant there are still outstanding matters to be addressed.

### **Solar Panels**

The applicant has presented a research paper on the 'Hydrologic Response of Solar Farms', during the research different scenarios, including ground cover, soil type, storm magnitude and ground slope were modelled. Comparing the parameters input into the modelling of the research paper and the proposed site, it can be demonstrated that the solar panels are likely to have a negligible impact on the surface water runoff generated by the site, as the proposed site fits within most of the parameters modelled in the study. The largest impact to surface water runoff for a solar farm is the ground cover, the applicant has proposed that ground cover will consist of a wildflower meadow and species rich grass.

However, it must be noted that, no further details regarding the construction of the maintenance tracks have been provided and therefore an assessment of the impact of the surfacing cannot be made. As concluded in the study, materials such as gravel can increase the storm runoff and peak discharge, especially if the materials referred to as gravel are in fact relatively impermeable materials such as self-binding gravel, hoggin, compacted MOT type 1 etc. More detail is required on the specific buildup of the access tracks, including materials, depths, permeabilities and infiltration calculations if this is to be the method of discharge for these areas.

It is understood that the interception ditch was previously requested by the LLFA and therefore the applicant must confirm that the ditch will be incorporated, with details including dimensions, storage capacity, connection to the watercourse and discharge rate.

### **Battery Energy Storage System (BESS)**

Within the 'Pre-application Statement Flood and Surface Water Drainage Matters' it has been stated that the BESS will be storing water for reuse in the event of a fire, however, no further details have been provided. A drainage plan must be provided as well as calculations for the proposed system. The calculations must demonstrate that the proposed system can manage a 1 in 30 year rainfall event without flooding and that the 1 in 100 year plus 45% climate change allowance can be managed onsite must be provided. Details regarding how runoff

would be managed in the event of exceedance of the system is also required, as it is not clear if there is an overflow system from the storage tanks.

In the event of a fire, and to prevent contaminated water reaching watercourses or groundwater, appropriate pollution prevention measures, such as firewater storage areas, penstocks or shut-off valves must also be included in the design of the system and details of these elements are to be provided. Sizing calculations are also required for the firewater storage areas, along with details of the procedures which will be in place in order to prevent pollution in the event of a fire, and how these will be communicated to site staff.

#### **Additional Comments**

Information relating to the management and maintenance of the surface water drainage system for the lifetime of the development, especially for the BESS, must be provided. Information regarding how surface water runoff will be managed during the construction phase must also be provided.

#### **Further information required**

The LLFA requests that the applicant provides additional information as discussed above, this information shall include:

- Details of the maintenance track construction and surface water management
- Details of interception ditch including dimensions, storage capacity, how it will connect to the watercourse and discharge rate
- Drainage plan for the BESS, which show storage tanks, overflow system and firewater arrangements
- 1 in 30 year and 1 in 100 year plus 45% climate change allowance calculations for the BESS, and calculations and procedures for firewater management
- Details of the management and maintenance of the surface water drainage
- Details of how surface water runoff will be managed during construction

#### **Informative**

##### *Land Drainage Consent*

Under the terms of the Land Drainage Act 1991 and the Floods and Water Management Act 2010, the prior consent of the Lead Local Flood Authority is required for any proposed works or structures in an ordinary watercourse. Land Drainage Consent must be applied for and granted by LLFA before works to ordinary watercourses can be undertaken. Information and the application form can be found on the Isle of Wight Council website. Please be aware that this process can take up to two months.

Yours sincerely,

**Luke Virgo**

Principal Engineer (JBA Consulting on behalf of the Lead Local Flood Authority)