



OAKLANDS FARM SOLAR PARK

Applicant: Oaklands Farm Solar Ltd

Environmental Statement

Appendix 8.2 – Water Framework Directive Assessment

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Appendix 8.2: Water Framework Directive Assessment

Final report

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Oaklands Solar Farm: Water Framework Directive Assessment

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Appendix A Report Conditions



1. Introduction

1.1. Report context

Oaklands Solar Farm Ltd (the Client) are in the process of preparing and submitting a planning application for a large solar farm on land near Rosliston, Derbyshire (the Site). The application is being made under the Nationally Significant Infrastructure Projects (NSIP) development Consent Order (DCO) regime.

As part of ongoing work, Yellow Sub Geo Ltd (Yellow Sub) have been in contact with the Environment Agency (EA) on behalf of the Client to determine the requirement for a Water Framework Directive (WFD) assessment which was confirmed by the EA in an email dated 23rd March 2022 in which they request a screening assessment to be undertaken. This report addresses this need for the aforementioned screening assessment of the potential impact of the works under the WFD.

1.2. Site context

The location of the Site is presented on Drawing P20209_R4_D01. It comprises a series of fields within the catchments of the Rivers Trent and Mease. The majority of the Site drains directly, via a series of ditches and a small watercourse, to the River Trent. A small area in the far north of the Site drains into the catchment of Darklands Brook, itself a tributary of the River Trent. A small area in the very south of the Site is on land that lies in the catchment of the River Mease, which is again a tributary of the River Trent.

The River Mease is designated as a Special Area for Conservation (the River Mease SAC).

1.3. Report scope

This report presents an assessment of the potential impacts that the proposed works may have on the water bodies to which the land drains, and whether the proposed works comply with the requirements of the river basin management plan (RBMP). The aim of the report is to determine whether the proposed works will affect the environmental objectives of the WFD, which are;

- to prevent deterioration of the status of surface waters and groundwater;
- to achieve objectives and standards for protected areas;
- to aim to achieve good status for all water bodies or, for heavily modified water bodies and artificial water bodies, good ecological potential and good surface water chemical status;
- to reverse any significant and sustained upward trends in pollutant concentrations in groundwater;



- attain the cessation of discharges, emissions and losses of priority hazardous substances into surface waters; and,
- progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants.

The Humber River Basin District River Basin Management Plan (EA 2015)¹ provides water body objectives and this document assesses the potential impact that the proposed works may have on attaining these objectives.

1.4. Limitations

This report is written strictly for the benefit of the Client and bound by the conditions presented in Appendix A.

¹ EA, 2015, Humber River basin District River Basin Management Plan. Part 1



2. Proposed Development

The Proposed Development is summarised in the works plan is shown in Appendix 1.3 of the Environmental Statement. It comprises a proposed solar farm with an associated Battery Energy Storage System. The Proposed Development would have a generating capacity of over 50MW and would be situated on 191 hectares of land at Oaklands Farm to the south-east of Walton-on-Trent and to the west of Rosliston in south Derbyshire. The solar farm itself, comprising photovoltaic panel arrays, a central electricity substation and Battery Energy Storage System together with access, landscaping and other works would be located on 135 hectares of agricultural land currently in use for arable production and grazing. A high voltage underground electricity cable would then run through land at Fairfields Farm and Park Farm to the north to connect the solar farm to the national grid via an electricity substation located at the former Drakelow Power Station which sits south of Burton-upon-Trent. The construction of the above infrastructure will involve the formation of construction compounds, access tracks and other temporary works.

With respect to the unnamed watercourse on Site, the Proposed Development also includes:

- 4No. points where the underground 132kV grid connection cable crosses the unnamed tributary of the River Trent;
- 3No. points where the new access track crosses the unnamed tributary of the River Trent; and,
- 1No. location where a new medium voltage cable and access track cross a field ditch which forms a branch of the unnamed tributary of the River Trent. This is positioned in an area where this ditch is already culverted.

The location of proposed watercourse crossings can be seen on the layout drawings in Figure 4.11 of the Environmental Statement,



3. The water bodies

3.1. Water bodies with which the Proposed Development may interact

Drawing P20209_R4_D01 provides a plan of the Site boundary and the waterbody catchments as defined by the EA Catchment Data Explorer².

As can be seen, the Site is primarily within a catchment that drains directly to the River Trent via an unnamed watercourse that flows through the Site, and an associated network of drainage ditches. This falls within the catchment of the *Trent – Tame to Dover Rivers* waterbody.

In the far north of the Site, the proposed route of the new grid connection cable crosses into land that is part of the catchment of the *Darklands Brook (trib of R Trent)* water body.

In the far south of the Site, the very southern edge of the southernmost field is within the catchment of the *Mease from Hooborough Brook to Trent* waterbody which is within the catchment of the River Mease.

3.2. Current waterbody status

WFD Cycle 3 data is available for all three waterbodies (EA, 2019³). This is summarised in Table 3-1.

² EA, 2019. Catchment Data Explorer website, <https://environment.data.gov.uk/catchment-planning/WaterBody/GB104028047180?cycle=3> accessed March 2023

³



Table 3-1 Current (2019) waterbody status

	River Trent (R Tame to R Dove)	River Trent Darklands Brook	River Mease (Hooborough Bk to Trent)
Overall waterbody status	Poor	Moderate	Moderate
Ecological status	Poor	Moderate	Moderate
Fish status	Poor	Moderate	N/A
Invertebrates	Moderate	High	Moderate
Macrophytes and phyto-benthos status	Moderate	Moderate	Moderate
RNAG ecological status	Urbanisation, poor livestock management, sewage discharge	Poor livestock management/ Unknown	Urbanisation, poor livestock management, sewage discharge
Physico-chemical quality elements	Moderate (poor for phosphates)	Moderate	Good
RNAG (physico-chemical)	Phosphates from poor livestock management and sewage discharge. Urbanisation.	Phosphates from poor livestock management and sewage discharge.	N/A
Hydromorphological supporting elements	Supports good	Supports good	Supports good
Chemical status	Fail	Fail	Fail
RNAG (chemical)	Mercury, PBDE, PFOS	Mercury and PBDE	Mercury and PBDE



3.3. Waterbody objectives

The objectives for the waterbodies are set out in EA 2019. These are reproduced in Table 3-2.

Table 3-2 Status objective for the three water bodies (EA 2019)

	Objective	Constraint
River Trent (R Tame to R Dove)		
Ecological status	Good by 2027. Low confidence	Disproportionately expensive and disproportionately burdens
Physico-Chemical status	Good by 2027. Low confidence	Disproportionately expensive and disproportionately burdens
Hydromorphological supporting elements	Good by 2015.	None
Chemical status	Good by 2063	Natural conditions: Chemical status recovery time. No known technical solution is available.
Darklands Brook		
Ecological status	Good by 2027. Low confidence.	Disproportionately expensive and disproportionate burdens.
Physico-Chemical status	Good by 2015.	None
Hydromorphological supporting elements	Good by 2015	None
Chemical status	Good by 2063	Disproportionately expensive and disproportionate burdens. Natural conditions: Chemical status recovery time



River Mease (Hooborough Bk to Trent)		
Ecological status	Good by 2027. Low confidence.	Disproportionately expensive and disproportionate burdens. Practical technical constraints prevent implementation by an earlier deadline.
Physico-Chemical status	Good by 2027. Low confidence.	Practical technical constraints prevent implementation by an earlier deadline.
Hydromorphological supporting elements	Good by 2015	None
Chemical status	Good by 2063	Natural conditions: Chemical status recovery time



4. Screening and scoping

4.1. Screening

The proposed works do not fall within categories that do not require a WFD assessment. As such, the assessment has automatically been taken forward to the scoping stage.

4.2. Scoping

Guidance requires that the WFD assessment consider the following receptors:

- hydromorphology;
- biology – habitats;
- biology – fish;
- water quality and;
- protected areas.

An assessment is also required if there is a risk of introducing invasive non-native species through the proposed works.

In considering whether potential impacts to each of these receptors should be assessed within the scope of this document, the nature of the proposed works and their interaction with the aquatic and fluvial environment was considered. Of particular importance are the following factors:

- 1) The Site is currently used for intensive arable agriculture, with at least 50% of fields ploughed on an annual or rotation basis for arable production. Manure, artificial fertiliser and herbicides are used to facilitate this arable production.
- 2) As fields are regularly ploughed at present, a significant proportion of the land is left with no vegetation for periods between ploughing and crop establishment. This increases the risk of surface-water runoff including sediment into water bodies.
- 3) All three water bodies include agricultural contribution of phosphate as one of the reasons for not achieving good status.
- 4) Once operational, the land will no longer be used for intensive agriculture. Land around and in between the solar array will be used for low intensity grazing with a permanent grass sward. The nutrient input to the land will therefore significantly decrease, as will the risk of surface water run-off (due to the elimination of periods of bare ploughed soil).
- 5) The Proposed Development has been designed to provide a minimum 8 m buffer with no development on either side of the unnamed tributary of the River Trent that crosses the Site. If works are required within 8m and where required, a Flood Risk Activity Permit (FRAP) will be sought from the EA.



- 6) With the exception of the new underground grid connection route, The Proposed Development has been designed to remain outside of the small corridor of Flood Zone 2 and Flood Zone 3 that is present either side of the unnamed tributary of the River Trent.
- 7) The drainage for the Proposed Development includes source control SuDS features to attenuate run-off from areas of hard infrastructure (e.g. substation).
- 8) There is no direct pathway for migration of surface water from the Site to the River Mease or Darklands Brook. In both cases, whilst a small area of the Site is within the respective catchment, no ditch or other drainage feature is present that would provide direct connection to the water bodies.
- 9) Delivery of the construction phase of development will be undertaken in accordance with a Construction Environmental Management Plan (CEMP), including a surface water management plan. This is to be a DCO requirement of any permission granted.
- 10) Where the crossing of the unnamed tributary is required to construct the proposed grid connection and trackways, these shall be controlled under the CEMP and where required, will be undertaken following obtaining Ordinary Watercourse Consent (OWC) from the Lead Local Flood Authority (LLFA). Suitable measures shall be employed to avoid, manage and mitigate impacts to the aquatic environment. Any such impacts will be short-term and local to each crossing location.
- 11) The panels chosen for the photovoltaic array will not be coated in perfluorinated compounds.

In light of these factors, the potential impact on each of the receptors is discussed in Table 4-1 and used to determine whether an assessment is scoped into this document. Section 5 then provides an assessment of impacts on those receptors scoped into the assessment:





Table 4-1 Scoping summary

Receptor	Comment	Assessment required?		
		R Trent	Darklands Brook	River Mease
Hydro-morphology	Development infrastructure and construction works remain outside of an 8m buffer from watercourses and outside Flood Zone 2 & 3. New cable crossings will be underground in accordance with OWCs. New trackway crossings will be in accordance with OWCs. If required a FRAP will also be applied for.	No	No	No
Biology - habitats	Watercourses within and adjacent to Site are deemed to be of low suitability to aquatic species due to their ephemeral low-flowing nature. The watercourses do not contribute to key movement corridors along important watercourses and water catchment areas. Some limited and very short term impact will be seen during construction of watercourse crossings. Three new trackway crossings will lead to the culverting of the watercourse.	Yes	No	No
Biology - fish		Yes	No	No
Water quality	Some small potential for run-off from construction and new watercourse crossing construction into aquatic environment	Yes	No	No
Protected areas	The nearest protected site (River Mease SAC) has no hydraulic connection to the Site.	No	No	No
Invasive non-native species	Several species of invasive non-native species were identified within the Site boundary including Himalayan Balsam, Rhododendron, Cherry Laurel and Buddleia. Japanese knotweed was also recorded in the woodland off-site, approximately 400m to the east. However, no invasive non-native species were recorded within the water corridors. The CEMP shall include measures to prevent spread of or introduction of invasive non-native species.	No	No	No



5. Impact assessment

5.1. Protected areas

Whilst a very small area of the Site falls within the catchment of the River Mease SAC, there are no ditches or watercourses connecting the Site directly or indirectly to this watercourse nor any of its tributaries. It is therefore concluded that no meaningful pathway exists between the Site and protected sites.

5.2. Biology – habitats and fish

Impacts to fish and aquatic vertebrates have been scoped out of the assessment as there is no potential for significant effects to occur to these species. Watercourses within and adjacent to the Site are of low suitability for these species as they are low flowing and ephemeral habitats that do not contribute to key movement corridors along important watercourses and water catchment areas. Alongside this, the Proposed Development has been designed from the outset to provide embedded avoidance and mitigation measures, which provide certainty that any effects to these watercourses will be avoided.

New underground cables are to be installed beneath the watercourse in 4No. locations. In one of these (adjacent to the point of the existing culvert beneath Rosliston Road), horizontal directional drilling (HDD) shall be used to facilitate the crossing. In this location, all construction works for the cable crossing will remain outside of the 8 m buffer either side of the watercourse.

In the case of the other 3No. cable crossings, and also the 3No. proposed new trackway crossings, mitigation measures will include phasing of these works during dry periods, as the watercourse is ephemeral. Further mitigation measures shall be agreed with under the terms of an Ordinary Watercourse Consent for the works and delivered via the CEMP.



5.3. Water quality

5.3.1. Construction phase

During the construction phase, there is potential for a short-term impact on water quality. This is considered likely to impact the unnamed tributary of the River Trent only and so is not relevant for the Darklands Brook or River Mease catchments.

Any such construction-phase impacts can be properly and effectively controlled through the design and implementation of the CEMP and surface water management plan (SWMP). A CEMP, with SWMP as an appendix (see **ES Appendix 4.3**), will form a DCO requirement upon any permission granted.

Standard and well-established construction methods can be deployed to control potential impacts on water quality during construction. As such, it is considered that this receptor can be suitably protected.

5.3.2. Operational phase

The current use of the land is for intensive agriculture, with approximately 50% of the land given over to arable. There is a nutrient and artificial pesticide input to this operation.

Phosphate loading is one of the reasons that the water bodies are not attaining Good status at present.

Under the Proposed Development, the land beneath and around the solar arrays will be used for low intensity grazing. Nutrient and pesticide input will therefore be significantly reduced.

It is therefore considered that the Proposed Development can positively contribute to the process of attaining Good water quality with respect to nutrient loading in the three water bodies, particularly the River Trent (R Tame to R Dove) catchment, in which the vast majority of the Site is situated.



6. Conclusions

The Proposed Development has been designed such that the vast majority of new infrastructure is set back from the watercourse on Site and hence will have very limited interaction with it.

Standard and well-established construction methods can be deployed to control potential impacts on water quality during construction.

Where construction-phase interaction with a watercourse is required, this only affects the River Trent (R Tame to R Dove) waterbody catchment. The new trackway and cable crossings of the unnamed tributary of the River Trent have been designed and can be constructed in a manner that suitably controls potential impacts on habitats, fish and water quality.

The requirement for a CEMP and SWMP is to be secured via DCO requirement to any permission granted and construction-phase interactions with the unnamed tributary will be further controlled under the requirements of OWC and, if required, a FRAP.

In the light of these factors, it is concluded that the construction phase of the Proposed Development will not affect the aims and objectives of the RBMP.

During the operational phase of the Proposed Development, it is considered that potential positive contributions to the improvement of chemical water quality may be possible due to the removal of the development area from intensive agriculture.

The overall conclusion is therefore that:

- a) The short-term construction-phase impacts are of sufficiently short duration and can be sufficiently well avoided, minimised and mitigated such that there will be no adverse effect on the status of the water bodies, nor the aims and objectives of the RBMP; and,
- b) The long-term operational phase impacts are considered likely to contribute to an improvement in the status of the River Trent (R Tame to R Dove) waterbody status through the reduction in nutrient and pesticide input that the Proposed Development will provide.



Appendices



Appendix A: Report Conditions



Report Conditions

This report has been prepared by Yellow Sub Geo Ltd. (Yellow Sub Geo) in its professional capacity as soil and groundwater specialists, with reasonable skill, care and diligence within the agreed scope and terms of contract and taking account of the manpower and resources devoted to it by agreement with its client, and is provided by Yellow Sub Geo solely for the internal use of its client.

The advice and opinions in this report should be read and relied on only in the context of the report as a whole, taking account of the terms of reference agreed with the client. The findings are based on the information made available to Yellow Sub Geo at the date of the report (and will have been assumed to be correct) and on current UK standards, codes, technology and practices as at that time. They do not purport to include any manner of legal advice or opinion. New information or changes in conditions and regulatory requirements may occur in future, which will change the conclusions presented here.

Where necessary and appropriate, the report represents and relies on published information from third party, publicly and commercially available sources which is used in good faith of its accuracy and efficacy. Yellow Sub Geo cannot accept responsibility for the work of others.

Site investigation results necessarily rely on tests and observations within exploratory holes only. The inherent variation in ground conditions mean that the results may not be representative of ground conditions between exploratory holes. Yellow Sub Geo take no responsibility for variation in ground conditions between exploratory positions.

This report is confidential to the client. The client may submit the report to regulatory bodies, where appropriate. Should the client wish to release this report to any other third party for that party's reliance, Yellow Sub Geo may, by prior written agreement, agree to such release, provided that it is acknowledged that Yellow Sub Geo accepts no responsibility of any nature to any third party to whom this report or any part thereof is made known. Yellow Sub Geo accepts no responsibility for any loss or damage incurred as a result, and the third party does not acquire any rights whatsoever, contractual or otherwise, against Yellow Sub Geo except as expressly agreed with Yellow Sub Geo in writing. Yellow Sub Geo reserves the right to withhold and/ or negotiate the transference of reliance on this report, subject to legal and commercial review.