

Paper Mill Farm VEP Hydroelectric Project

Water Framework Directive Assessment

Renewables First – Company

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Document Control

Version	Date of Issue	Author(s)	Reviewed by
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1 Introduction

Introduction to assessment

- 1.1 This document has been produced in connection with an abstraction licence application for a hydropower scheme at Paper Mill Farm on the River Ouzel.
- 1.2 The Environment Agency's *Guidance for run-of-river hydropower: the Water Framework Directive, nature conservation and heritage* dated December 2013 has been followed as part of this assessment.
- 1.3 The assessment will review the potential effects arising from the proposal in relation to:
 - flow patterns
 - sediment availability
- 1.4 The Water Framework Directive (2000/60/EC) (WFD) was passed by the European Union in 2000. It became part of UK law in 2003 with the issue of The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003.
- 1.5 The WFD is implemented regionally by river basins. Each river basin has a River Basin Management Plan (RBMP) which is updated every six years. The RBMP documents the current status of the water bodies and the pressures affecting them. It outlines the improvements that can be made within the current management period and the programme of investigations to be carried out.
- 1.6 The fundamental objectives of the WFD that apply to surface water bodies are:
 - Prevent deterioration of the status of water bodies
 - Achieve at least good ecological status and good surface water chemical status by a set date
 - Reduce pollution from priority substances and eliminate priority hazardous substances as defined by the European Commission
- 1.7 In addition to the objectives above there are further standards and measures to be met in areas defined as protected areas. These areas are listed in the RBMPs.
- 1.8 Artificial or Heavily Modified Water Bodies (AWB, HMWB) cannot achieve good ecological status as they are unable to get close enough to the required natural conditions. Instead the aim is to achieve good ecological potential.
- 1.9 The RBMPs detail the Environment Agency (EA) objectives specific to each water body that are designed to meet the WFD objectives. The proposed measures to meet the objectives are also given.

Purpose of Assessment

- 1.10 This assessment has been undertaken to fulfil the requirements under the Water Framework Directive.
- 1.11 The EU Water Framework Directive requires environmental objectives be set for all surface and ground waters to enable them to achieve good status or potential for heavily modified water bodies by a defined date. One objective is to prevent further deterioration which can include changes to flow pattern, width and depth of channel, sediment availability/transport and ecology and biology.
- 1.12 This assessment looks at the current status of the water bodies that may be affected by the proposed hydropower system and discusses whether or not the proposal will deteriorate the ecological quality of the water bodies or prevent the water bodies from achieving good ecological status.
- 1.13 Any EA defined objectives and measures that are specific to the water body will be considered to determine if the proposed hydropower system will prevent these objectives and measures from being realised.
- 1.14 The assessment includes any cumulative or in-combination effects.
- 1.15 If this assessment finds that the proposal is likely to contravene the WFD, then further more detailed assessments will be recommended.

Site description

- 1.16 The proposed development is located adjacent to a weir near Paper Mill Farm on the River Ouzel. The village of Stoke Hammond is located approximately 600m west.
- 1.17 At this point the river splits upstream of the weir with the original river channel passing Paper Mill Farm to the west and a mill leat, which used to run through the Paper Mill, passing to the east. The channels converge approximately 230m downstream. Paper Mill farm is situated on an island between the two channels.
- 1.18 The surrounding area is predominantly rural.

Other Schemes

- 1.19 There are no known hydropower schemes within 5km of the proposed development.

Scheme Description & Status

- 1.20 This proposal involves the installation a single Aquazoom vortex turbine and associated equipment within a new channel on the left bank. The intake of the proposal will be located

at OS grid reference SP 89078 29250 and the outfall will be located at OS grid reference SP 89083 29264.

1.21 The overall classification for the waterbody during the 2016 cycle at this location is **moderate**.

Current WFD status

Site Name	Paper Mill Farm
Location	River Ouzel
OS Grid Reference (Intake)	SP 89078 29250
OS Grid Reference (Outfall)	SP 89083 29264
Water body name	Ouzel US Caldecote Mill
Water body ID	GB105033037971
Catchment Area	91.809 km2
Management Catchment	Ouse Upper and Bedford
River Basin District	Anglian
Hydromorphological Designation	heavily modified
Overall 2016 Classification	Moderate

2 Expected impact arising from proposal on WFD Objectives

Impact on Current WFD Status

2.1 The following table reviews the RBMP plan and specifically for the relevant Ouzel US Caldecote Mill waterbody.

Receptor	Current status (2016 C2)	Objectives	Potential impact	Assessment	WFD compliance	Further assessment
Element – Biological Quality						
Fish	High	Good 2015	No impact	The scheme will not change any of these parameters significantly. No change – neutral impact on delivery of WFD. The development provides an alternative downstream fish passage route through the turbine.	Yes	No
Element – Hydromorphological Supporting Elements						
Hydrological Regime	Supports Good	Supports Good 2015	No impact	The scheme will not change any of these parameters significantly. No change – neutral impact on delivery of WFD.	Yes	No
Element – Physico-chemical quality elements						
Overall	Moderate	Moderate 2015	No impact	The scheme will not change any of these parameters significantly. No change – neutral impact on delivery of WFD.	Yes	No
Dissolved Oxygen	High	Good 2015	No impact	The scheme will not change any of these parameters significantly. No change – neutral impact on delivery of WFD.	Yes	No

Receptor	Current status (2016 C2)	Objectives	Potential impact	Assessment	WFD compliance	Further assessment
Phosphate	Poor	Moderate 2015	No impact	No change – neutral impact on delivery of WFD.	Yes	No
Element – Specific Pollutants - NOT ASSESSED						
Element – Chemical – Overall						
Overall	Good	Good 2015	No impact	No change – neutral impact on delivery of WFD.	Yes	No
Element – Chemical – Other Pollutants - DOES NOT REQUIRE ASSESSMENT						
Element – Chemical – Priority hazardous substances - DOES NOT REQUIRE ASSESSMENT						
Element – Chemical – Priority substances - DOES NOT REQUIRE ASSESSMENT						

2.2 All conditions summarised above provide no impact on each of the WFD elements assessed.

3 Detailed review

River basin and management catchment summary

- 3.1 The Anglian river basin district covers 27,900km² and extends from Lincolnshire in the north to Essex in the south and from Northamptonshire in the west to the east Anglian coast. The River Great Ouse dominates the catchment.
- 3.2 The Upper and Bedford Ouse Management Catchment is largely used for agriculture, particularly horticulture, arable and livestock farming. With extensive sand, gravel and clay deposits, the catchment continues to be important for surface quarrying industries. There are a total of 93 waterbodies within the management catchment area.
- 3.3 Both the River Great Ouse and River Ouzel are designated as Sensitive Areas (eutrophic) under the Urban Waste Water Treatment Directive and most of the catchment is designated as a Nitrate Vulnerable Zone. No water will be abstracted from groundwater.
- 3.4 A major reason for water bodies in the catchment being below good status or potential is the discharge of effluent from water recycling centres. Another major failure is from diffuse pollution sources, such as agricultural and urban run-off. Other reasons for failure can be influenced by: problems with flow; barriers and structures; unregulated activities, such as small domestic sewage discharges; and foul water/sewage misconnections into the surface water drainage system.
- 3.5 There are two measures which the predicted improvements in the status of water bodies by 2021 are based upon and these fall within the water industry sector. They are; to reduce point source pollution at source by Prohibiting/controlling uses of certain substances/chemicals within the waste water treatment.

Operational catchment summary

- 3.6 Milton Keynes, a major urban area, dominates the north of the catchment. The rest of the catchment is mainly rural. The Grand Union Canal runs north-south along the River Ouzel valley.
- 3.7 There are 14 waterbodies within the Ouzel and Milton Keynes operational catchment.
- 3.8 At present, there are no measures within this catchment which the predicted improvements in the status of water bodies by 2021 are based upon. Other measures may be taking place, but there is not enough confidence (in location or scale of improvement) to predict specific outcomes based upon them.¹

¹ <http://environment.data.gov.uk/catchment-planning/OperationalCatchment/3349/Summary>

Ecological and chemical classification for surface waters | 2016 Cycle 2

2016 Cycle 2 ▾

Number of water bodies	Ecological status or potential					Chemical status	
	Bad	Poor	Moderate	Good	High	Fail	Good
14	0	2	10	2	0	0	14

Summary of ecological status or potential and chemical status and objectives for surface water bodies (number of water bodies) including those with less stringent objectives and extended deadlines (blue shaded cells)

	Ecological status or potential						Chemical status			Extended Deadline
	Bad	Poor	Moderate	Good	High	Total	Fail	Good	Total	
By 2015	0	0	9	3	0	12	0	14	14	
By 2021	0	0	0	0	0	0	0	0	0	
By 2027	0	0	0	2	0	2	0	0	0	
Beyond 2027	0	0	0	0	0	0	0	0	0	
Total	0	0	9	5	0	14	0	14	14	
Less Stringent							Less Stringent			

Figure 1: EA summary of operational catchment status and status objectives.

3.9 The main of RNAGs in this catchment are primarily pollution from rural areas under the agriculture and rural land management sector, pollution from waste water within the water industry sector and negative effects of non-native species.

Ouzel US Caldecote Mill

3.10 The 2016 cycle 2 classification is **moderate**. The waterbody is working towards a 2021 objective of good status overall. The relevant receptors impact on the Water Framework Directive have been assessed earlier in the report.

Cycle 2 classifications ⁱ

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Classification Item	2013	2014	2015	2016
Overall Water Body	Moderate	Moderate	Moderate	Moderate
Ecological	Moderate	Moderate	Moderate	Moderate
Supporting elements (Surface Water)	Moderate	Moderate	Moderate	Moderate
Biological quality elements	Moderate	Good	Good	Good
Fish	Good	High	High	High
Invertebrates	Moderate	Good	Good	Good
Hydromorphological Supporting Elements	Supports Good	Supports Good	Supports Good	Supports Good
Physico-chemical quality elements	-	-	Moderate	Moderate
Specific pollutants	High	High	-	-
Chemical	Good	Good	Good	Good
Priority substances	Good	Good	Does not require assessment	Does not require assessment
Other Pollutants	Does not require assessment			
Priority hazardous substances	Good	Good	Does not require assessment	Does not require assessment

Figure 2: EA summary of the waterbody cycle 2 status

- 3.11 The EA catchment planning website cites the Reasons for Not Achieving Good Status (RNAGS) classification elements as phosphate from the water industry, urban and transport and the agricultural and rural land management sectors and physical modifications from pressures such as flood protection, land drainage and urbanisation.
- 3.12 For phosphate elements currently no known technical solution is available.
- 3.13 Appropriate pollution prevention measures will be implemented to protect the River Ouzel from leakages of fuels or lubricants from vehicles and equipment and from siltation and run off during the construction period. The Environment Agency's Pollution Prevention Guidance series is currently under review and at this time is not classed as 'good practice'. In lieu of any other interim advice or guidance, however, these documents are still considered to provide useful advice on avoiding or minimising the risk of pollution events. There is no requirement to store chemicals, oils or fuels onsite.
- 3.14 Provided the pollution prevention measures are implemented, the water quality will not be significantly adversely affected by the proposal.
- 3.15 The proposed development will not introduce any chemicals or pollutants into the waterbody and therefore will not have a negative impact on the waterbodies chemical status.

Biodiversity and fish passage

- 3.16 The immediate area is not subject to any environmental designations.
- 3.17 Currently there are no fish pass provisions at the weir. When the weir is impassable fish passage through the mill leat channel is possible. The development will provide an alternative route for safe downstream fish passage.
- 3.18 The development does allow safe downstream passage and it will be screened in line with EA guidance.
- 3.19 Overall the hydropower scheme does not create any additional barrier to fish passage.

Hydromorphology

- 3.20 Due to the location of the hydropower scheme, the flow will only be slightly diverted away from the main watercourse to pass through the HEP scheme before re-joining the river. The flow will be as-existing during flood events. In major flood events the HEP will shut down, so during the periods of greatest geomorphological change, the site will be as-existing.
- 3.21 There will be no significant impacts to the hydrology during construction. The construction will take place predominantly within the existing bank, and flows will be unaltered until the turbines are commissioned.
- 3.22 In summary, the proposed development is deemed highly unlikely to result any significant hydromorphological changes.

4 Conclusion

- 4.1 The project and its construction will not release, generate or disturb any elements or substances not currently present in the river body. We see no impact on the current Good chemical status of the river.
- 4.2 Overall, this proposal is not expected to impact negatively on the current status of the water body and will not have an adverse impact on meeting future WFD objectives.