Hydro and Wind Consultancy, Design & Installation

Securing a clean energy future, profitably

Seaton Mill VEP Hydroelectric Project

Water Framework Directive Assessment

Renewables First Ltd
The Mill
Brimscombe
Stroud, Glos, GL5 2QG

Phone +44 (0)1453 88 77 44
Fax +44 (0)1453 88 77 84
Email info@renewablesfirst.co.uk
www. renewablesfirst.co.uk

Renewables First – Company

Renewables First is one of the UK's leading hydro and wind power specialists and has been delivering hydro and wind projects for over ten years. We provide all of the services from in-house resources to take a project from initial feasibility stage, through all of the consenting and engineering design stages and on to construction and commissioning. We use our experience of the installation and operational phases to provide feedback into the design stages of the next projects, ensuring that our customers benefit from our whole-project exposure.

We are independent of hardware suppliers, so we only recommend the most appropriate hardware to maximise energy production and return on investment, and to ensure a long and reliable operational life. We only recommend the best quality hardware from established manufacturers, and design good quality systems that will be reliable in the long-term. Our designs focus on maximising renewable energy production whilst applying best practice in regard to ecological protection or enhancement.

Document Control

Version	Date of Issue	Author(s)	Reviewed by
01	13/11/2018	Kelly Clutterbuck	Matt Lomax

Renewables First Ltd
The Mill
Brimscombe
Stroud, Glos, GL5 2QG

Phone +44 (0)1453 88 77 44
Fax +44 (0)1453 88 77 84
Email info@renewablesfirst.co.uk
www. renewablesfirst.co.uk

Contents

Renewables First Ltd
The Mill
Brimscombe
Stroud, Glos, GL5 2QG

Phone +44 (0)1453 88 77 44
Fax +44 (0)1453 88 77 84
Email info@renewablesfirst.co.uk
www. renewablesfirst.co.uk

1 Introduction

Introduction to assessment

1.1 This document has been produced in connection with an impoundment licence application for a hydropower scheme at Seaton Mill on the River Derwent.

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 additional 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.

Renewables First Ltd
The Mill
Brimscombe
Stroud, Glos, GL5 2QG
Phone +44 (0)1453 88 77 44
Fax +44 (0)1453 88 77 84
Email info@renewablesfirst.co.uk
www. renewablesfirst.co.uk

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 near Seaton Mill on the River Derwent.

1.17 Seaton Mill has flowing water on both sides of the property. The River Derwent flows to the front of the Seaton Mill buildings with a mill race flowing immediately adjacent to the property, and with a channel to Barepot Reservoir flowing to the rear.

1.18 Generally the ground onsite is relatively flat, laid to patio and sited alongside the council office mill structure.

Renewables First Ltd
The Mill
Brimscombe
Stroud, Glos, GL5 2QG
Phone +44 (0)1453 88 77 44
Fax +44 (0)1453 88 77 84
Email info@renewablesfirst.co.uk
www. renewablesfirst.co.uk

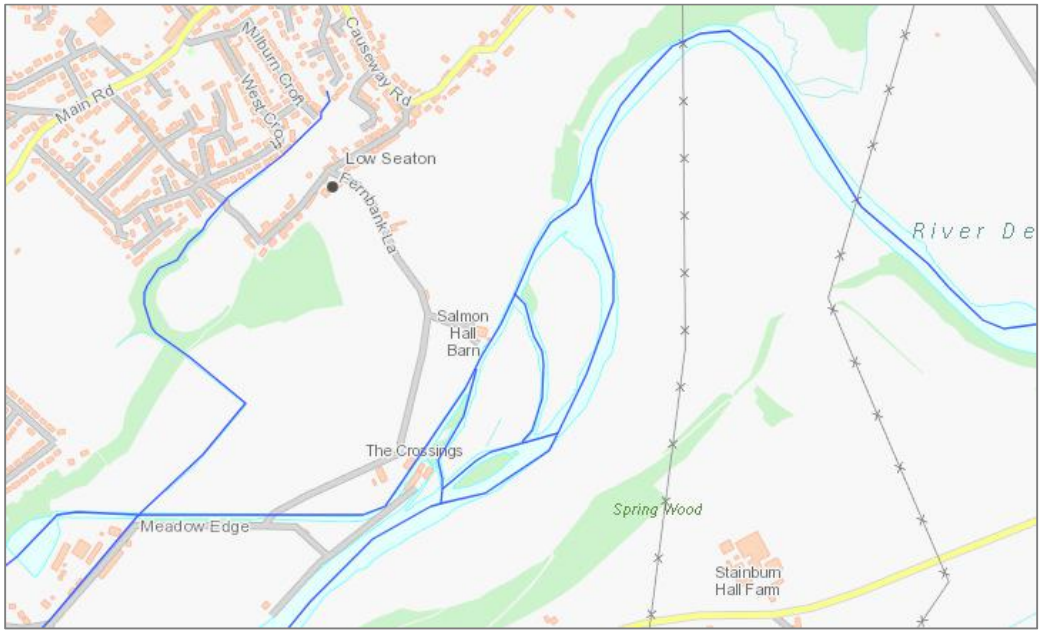

Figure 1: Main river map.

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 the right bank of the River Derwent. The intake of the proposal will be located at OS grid reference NY 02095 29625 and the outfall will be located at OS grid reference NY 02105 29615.

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

Current WFD status

Site Name	Seaton Mill
Location	River Derwent
OS Grid Reference (Intake)	NY 02095 29625
OS Grid Reference (Outfall)	NY 02105 29615
Water body name	Derwent – conf Cocker to tidal
Water body ID	GB112075070520
Catchment Area	36.632 km2
Management Catchment	Derwent North West
River Basin District	North West
Hydromorphological Designation	Not designated artificial or heavily modified
Surveillance Water Body	Yes
Overall 2016 Classification	**Good**

Renewables First Ltd
The Mill
Brimscombe
Stroud, Glos, GL5 2QG
Phone +44 (0)1453 88 77 44
Fax +44 (0)1453 88 77 84
Email info@renewablesfirst.co.uk
www. renewablesfirst.co.uk

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 Derwent – conf Cocker to tidal 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 and will be screened in line with EA guidance.	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	Good	Good 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	High 2015	No impact	The scheme will not change any of these parameters significantly. No change – neutral impact on delivery of WFD.	Yes	No

Renewables First Ltd
The Mill
Brimscombe
Stroud, Glos, GL5 2QG
Phone +44 (0)1453 88 77 44
Fax +44 (0)1453 88 77 84
Email info@renewablesfirst.co.uk
www. renewablesfirst.co.uk

Receptor	Current status (2016 C2)	Objectives	Potential impact	Assessment	WFD compliance	Further assessment
Phosphate	High	High 2015	No impact	The scheme will not change any of these parameters. No change – neutral impact on delivery of WFD.	Yes	No
Element – Specific Pollutants						
Overall	High	High 2015	No impact	The scheme will not change any of these parameters. No change – neutral impact on delivery of WFD.	Yes	No
Element – Chemical – Overall						
Overall	Good	Good 2015	No impact	The scheme will not change any of these parameters. No change – neutral impact on delivery of WFD.	Yes	No
Element – Chemical – Priority substances						
Overall	Good	Good 2015	No impact	The scheme will not change any of these parameters. No change – neutral impact on delivery of WFD.	Yes	No
Element – Chemical – Other Pollutants						
Overall	Good	Good 2015	No impact	The scheme will not change any of these parameters. No change – neutral impact on delivery of WFD.	Yes	No
Element – Chemical – Priority hazardous substances						
Overall	Good	Good 2015	No impact	The scheme will not change any of these parameters. No change – neutral impact on delivery of WFD.	Yes	No

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

Renewables First Ltd
The Mill
Brimscombe
Stroud, Glos, GL5 2QG
Phone +44 (0)1453 88 77 44
Fax +44 (0)1453 88 77 84
Email info@renewablesfirst.co.uk
www. renewablesfirst.co.uk

3 Detailed review

River basin and management catchment summary

3.1 The proposed development is located within the North West River Basin District (RBD). The district covers approximately 13, 200km2 extending from Cumbria to Staffordshire and includes parts of North Yorkshire and Merseyside. Approximately 80% of the district is rural.

3.2 Within the North West RBD the development is located within the Derwent North West Management Catchment.

3.3 For the waterbodies that have not achieved good status the Reasons for not achieving good status (RNAGS) in this catchment are primarily due to pollution from rural areas within the agriculture and rural land management sector. Other key reasons include pollution from waste water, physical modifications and pollution from mines.

Operational catchment summary

3.4 The proposed development is located within the Derwent Operational Catchment. The Derwent operational catchment rises in the north lakeland fells before flowing down to the Irish Sea at Workington.

3.5 There are a total of 24 waterbodies within the Derwent catchment.

3.6 For the waterbodies that have not achieved good status the Reasons for not achieving good status and reasons for deterioration in this Operational Catchment lie primarily within the agriculture and land management and mining and quarrying sectors. Consequentially a measure which the predicted improvement in the status of waterbodies by 2021 is based upon is the Minewater discharge remediation/treatment (Force Crag Mine in the Newlands Beck catchment).

3.7 Other key RNAGS are pollution from waste water, pollution from rural areas and physical modifications.

Ecological and chemical classification for surface waters | 2016 Cycle 2

2016 Cycle 2

	Ecological status or potential					Chemical status	
Number of water bodies	Bad	Poor	Moderate	Good	High	Fail	Good
24	0	3	12	9	0	2	22

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			
	Bad	Poor	Moderate	Good	High	Total	Fail	Good	Total	
By 2015	0	0	0	11	0	11	0	22	22	
By 2021	0	0	0	1	0	1	0	0	0	
By 2027	0	0	0	12	0	12	0	2	2	Extended Deadline
Beyond 2027	0	0	0	0	0	0	0	0	0	
Total	0	0	0	24	0	24	0	24	24	
	Less Stringent						Less Stringent			

Figure 2: EA summary of operational catchment status and status objectives.

Derwent – conf Cocker

3.8 The 2016 cycle 2 classification of the waterbodies ecological and chemical status is **good**. The relevant receptors impact on the Water Framework Directive have been assessed earlier in the report.

Cycle 2 classifications

Download as CSV

Classification Item	2013	2014	2015	2016
Overall Water Body	Moderate	Moderate	Good	Good
Ecological	Moderate	Moderate	Good	Good
Supporting elements (Surface Water)	Moderate	Moderate	-	-
Biological quality elements	Good	Good	Good	Good
Hydromorphological Supporting Elements	Supports Good	Supports Good	Supports Good	Supports Good
Physico-chemical quality elements	High	High	High	Good
Specific pollutants	High	High	High	High
Chemical	Good	Good	Good	Good
Priority substances	Good	Good	Good	Good
Other Pollutants	Good	Good	Good	Good
Priority hazardous substances	Good	Good	Good	Good

Figure 3: EA summary of the waterbody cycle 2 status

3.9 Appropriate pollution prevention measures will be implemented to protect the River Derwent 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 of fuels onsite.

3.10 Provided the pollution prevention measures are implemented, the water quality will not be significantly adversely affected by the proposal.

3.11 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

3.12 The River Derwent at this location is a protected area under the Habitats and Species Directive due its location within the River Derwent & Bassenthwaite Lake Special Area of Conservation (SAC). The site is also located within the River Derwent and Tributaries Site of Special Scientific Interest (SSSI). The site interest within these designations includes the following species; Atlantic Salmon, River lamprey, Brook lamprey, Sea lamprey, Otter and Floating water-plantain.

3.13 The development will not impede fish passage at this location or within the catchment. It will provide an alternative route for safe downstream fish passage. The development will be screened in line with EA guidance.

3.14 Overall the hydropower scheme does not create any additional barrier to fish passage.

Hydromorphology

3.15 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.

3.16 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.

3.17 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.