
ABINGDON WEIR WHITE WATER

A JOINT PROPOSAL FROM ABINGDON HYDRO, KINGFISHER CANOE CLUB & PATHFINDER YOUTH CANOE CLUB.

SUMMARY

The terms of the Abstraction Licence TH/039/0016/003 that Abingdon Hydro have been granted by the EA state that an agreement must be reached to enable the continued use of Abingdon Weir for White Water Canoeing by local canoe clubs and other paddlers.

This paper proposes a solution where, subject to there being sufficient flow for the Hydro scheme to operate, a weir gate would be opened by push button, downstream near water level. A proportion of the water previously flowing through the Hydro scheme would therefore be diverted to flow via the weir gate (i.e. no overall change in flow volume only flow route). The user would paddle up and push the button (accessible only from water level), one or two small radials would open, and after a fixed period they would close again. This can be repeated subject to there being sufficient flow. If the head water falls below a pre-determined level the Hydro screws will not operate and thus the gates will not open. The above approach delivers the following benefits:-

- Avoids the need for manual intervention by the lock keeper or other EA personnel.
- Ensures that Abingdon Hydro can maximise flow through the screws.
- Allows EA flood defence and river management requirements to be met.
- Provides white water on demand for paddlers when the river levels are suitable.

This provides a suitable balance between the recreational use of the weir and its potential for Hydro generation. Both the canoe clubs and Abingdon hydro consider this to be a sensible and practical arrangement.

INTRODUCTION

Abingdon Weir has 12 small manually operated radial gates, 3 large electrically operated radial gates and 7 large electrically operated sluice gates.

Abingdon Hydro is a community enterprise established by local residents to promote renewable energy and generate hydroelectric power from the River Thames by Abingdon Weir.

Abingdon Hydro are proposing an Archimedes screw driven hydro-electric generation which will be a run of river scheme that uses the river as it is, neither diverting it nor creating a reservoir. The same amount of water will flow as before construction, except that some of the water that would have gone through the weir will go through the screws instead. The screws are designed to make it attractive enough to become a local amenity and it is predicted to become carbon neutral after just four months of operation.

Kingfisher Canoe Club (KCC) & Pathfinders Youth Canoe Club (PYCC) are both based in Abingdon and are major users of the weir for paddling. They are representing not only themselves but other canoe & kayak users who are not part of these clubs but also are users of Abingdon Weir.

The white water created from the water passing through the small radials at Abingdon Weir is safe for both canoeists and kayakers to use for training and recreation. The weir is used most by paddlers from April through to the autumn when the Thames is traditionally at its lowest level.

The concern of the canoe clubs is that when the Hydro scheme takes flow through the screws, the flow of water through the small radials would decrease or stop, thereby removing the recreational potential of the weir. The EA has a statutory duty to provide for recreation on the river and has therefore written into the terms of the abstraction licence granted to Abingdon Hydro the following conditions:

9.16 The Licence Holder shall not abstract water until:

9.16.1 An agreement between the Licence Holder, Kingfisher Canoe Club and Pathfinder Youth Canoe Club is entered into to ensure that there is sufficient flow over the weir and through the sluice gates at Abingdon Weir for the Clubs' purposes;

and

9.16.2 The Licence Holder has provided a copy of that agreement, as executed, to the Agency.

This means that Abingdon Hydro cannot start abstracting water for their hydro generators until a method to allow sufficient water to flow over the weir for white water paddling to take place is incorporated into their plans.

As a result KCC, PYCC (representing paddling interests) and Abingdon Hydro have been working together to propose a solution that would meet the needs of both communities and comply with the extraction licence condition.

REQUIREMENTS

The following requirements need to be met in order for the solution to allow an agreement to be reached.

KCC / PYCC REQUIREMENTS

- Req 1. As a minimum to maintain existing capability for recreational use
- Req 2. Work with other parties to improve recreational use whilst supporting hydrogeneration
- Req 3. Provide access to recreational weir flow at all times when head water level is above or at the minimum level set by the EA. i.e. not restricted to timed period that will inevitably be incompatible with some user groups.
- Req 4. Automatic timed cut off would ensure water is not "wasted".
- Req 5. Automation to apply to a minimum of 2 gates - The most suitable gates for this activity are gates 2 and 4 of the small radials (counting from left as viewed looking upstream).

ABINGDON HYDRO REQUIREMENTS

- Req 6. Abingdon Hydro exists for the benefit of the local community, and any profit after paying the shareholders belongs to the community. The flow through one gate represents an income of approximately £5 per hour based on current values of tariff subsidy. Abingdon Hydro requires that the weir gates are configured in a way that maximizes the flow through the screws as much as is possible.
- Req 7. Operation must be according to the conditions set in the EA licence. This is based on hands off level i.e. generation is permitted only when the head water reaches SHWL+2", regardless of flow.

EA REQUIREMENTS

- Req 8. The EA must retain the ability to control the flow as it does now, both in normal conditions and in floods. This is the purpose of the conditions attached to the abstraction licence.

SOLUTION PROPOSAL

The following solution is presented as a way of meeting the requirements of all parties.

A minimum of two of the small weir gates will be automated so that they can be opened by a control preferably at water level. This control will be built as part of the hydro generator design and implementation and will have the following functionality:

- Sol 1. The gates will be opened by a control (preferably at water level) that can be operated by a paddler.
- Sol 2. The gates will close automatically after a preset period of time (2 hours is recommended).

- Sol 3. The gates will only open if the water level is high enough for power generation. If the level is near the lower limit, the screws will reduce their water intake while the gate is open.
- Sol 4. The existing manual controls will still be present and can be used by EA staff as required to override the automatic control.
- Sol 5. The default position of the gates will be closed so that in the event of a system failure no water will accidentally be released unless overridden manually.
- Sol 6. The system will be part of the design of the hydro generator and implemented and maintained by Abingdon Hydro. Procedures will be developed in conjunction with the EA to accommodate maintenance and emergency repairs.
- Sol 7. The gate automation system will not interfere with or disturb flood level flows

Table 1 shows how the solution fulfils the requirements.

Solution/Requirement	Req 1.	Req 2.	Req 3.	Req 4.	Req 5.	Req 6.	Req 7.	Req 8.
Sol 1.	✓		✓		✓			
Sol 2.				✓		✓		
Sol 3.			✓				✓	✓
Sol 4.			✓		✓			✓
Sol 5.								✓
Sol 6.		✓						
Sol 7.								✓

TABLE 1 - SOLUTION

Abingdon Hydro, KCC and PYCC believe that if this proposal is implemented it can deliver not only a clear way forward that delivers benefits for all three groups, but also deliver operational benefits for the EA through its use of more automated control.

IMPLEMENTATION

In order to implement this proposed solution the following activities will need to take place.

ACTIVITIES

- Agreement in principle of the proposed solution from the EA.
- Abingdon Hydro to produce Technical Design.
- EA approval of Technical Design.
- Operating procedures created and approved.
- Agreement between KCC/PYCC and Abingdon Hydro based upon technical design and operating procedures.
- Construction.

RESPONSIBILITIES

Table 2 shows who is responsible for which activities.

Activity	Abingdon Hydro	Environment Agency	KCC / PYCC
Solution Proposal	✓		✓
Agreement in principle of the proposed solution		✓	
Create Technical Design	✓		
Approve Technical Design		✓	
Create operating procedure	✓	✓	✓
Approve operating procedure		✓	
Write and sign agreement	✓		✓
Construction	✓		
Ongoing maintenance	✓		

TABLE 2 - RESPONSIBILITIES

CONTACTS

Abingdon Hydro: Richard Riggs, richard.riggs@physics.org, 01235 521931.

Kingfisher Canoe Club: Simon Knox (KCC Chairman), simon.knox@gmail.com, 07912323503

Pathfinder Canoe Club: David Surman (PYCC Chairman), davidsurman@hotmail.com, 01865373115