



eWaterpower

Reading Sustainability Centre Hydropower Project Initial Feasibility Study

The Initial Feasibility Study was completed on 18th February 2014 at the request of Mr Tony Cowley, of Reading Sustainability.

The object of the study was to evaluate the potential for hydropower generation at Caversham Weir. The following is a summary of the conclusions reached and agreed during the discussions of the options at the site.



The watercourse is the River Thames.

The proposed site is at the end of the weir between the weir and View Island at the start of the old mill leat.

The proposed turbine type is the Archimedean Screw (Screw). It is proposed to install 2 Screws.

The width of the structure for the 2 Screw channels will be approximately 7m.

ANDRITZ-Atro Agent



John 3:16

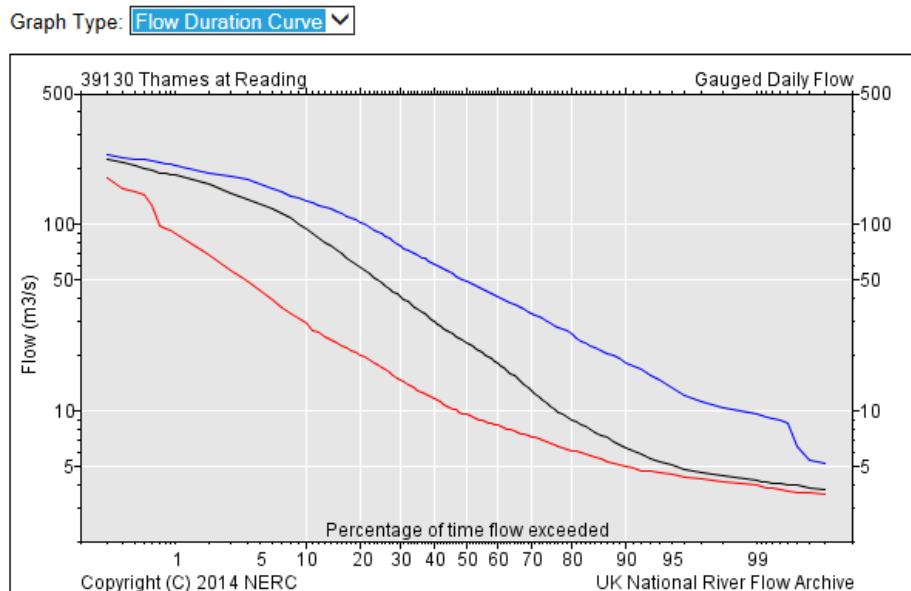
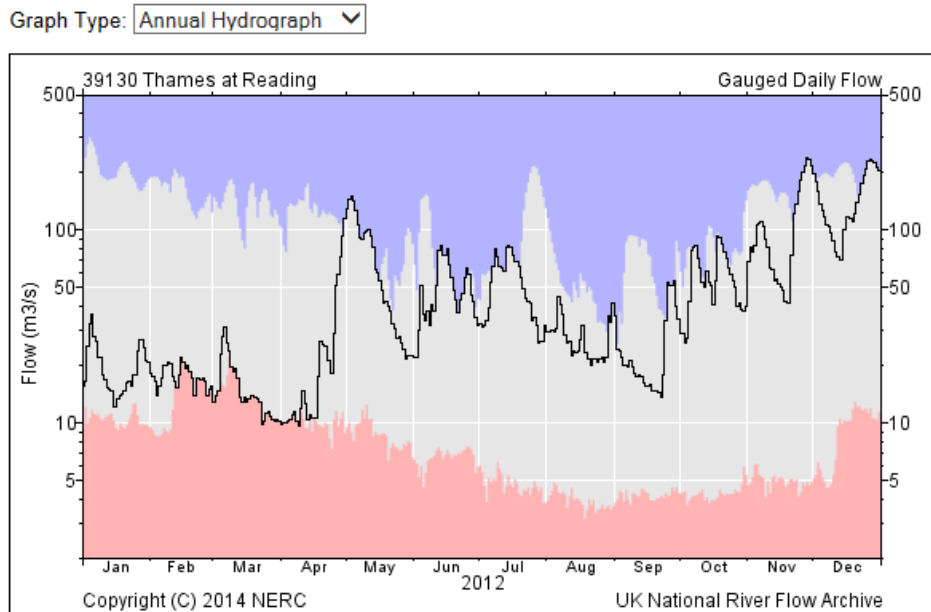


Electricity through waterpower



The published head at the site is 1.44m. It has been assumed a net head of 1.3m will be available. This will be confirmed once we have ordered and received the Lock Head and Tail levels data.

The flow for the site has been obtained from EA data based on the Reading Gauging Station 39130.



Annual mean flow 37.965 m³/s
Q95 5.1 m³/s
Q10 94.6 m³/s
Q50 23.3 m³/s
Q70 12.9 m³/s





The flow available will be restricted by a Hands off Flow (HoF) which will have to be left in the river at all times, this would normally be in the region of Q95. The proposal does not create depleted reach or a depleted weir pool and it may be possible to get a reduced HoF with the Screws considered the first gates in the weir pulling order.

Screening would be required dependant to stop large debris. A horizontal bar screen would be required with 150mm spacing.

There is already a fish pass on the weir relatively close to the scheme however the EA would probably request a fish pass alongside the scheme. An eel pass would be required.

The power potential for the site has been calculated using the standard power formula.

Power = Head x Flow x Gravity x turbine efficiency

Net Head 1.3m as earlier stated has been assumed until better data is available.

Flow through a Screw is limited by the diameter which is limited by the head available 1.3m head limits the Screw to 2.6m diameter which has a maximum flow of $2.8\text{m}^3/\text{s}$.

Gravity is 9.81m/s

Turbine efficiency presumed water to wire 74%

Power = $1.3 \times 2.8 \times 9.81 \times 0.74 = 26\text{kW}$

The Feed in Tariff (FiT) will be the band $>15\text{kW} - 100\text{kW}$. With 2 Screws a generation of 52kW can be expected.

The FiT is made up of a Generating Tariff at 19.72p/kW currently and an Export Tariff of 4.77p/kW .

This gives a FiT rate $\pounds 2,100$ per kW year. The British Hydropower Association (BHA) suggests an average of 50% of the design generation. This will be higher at Reading as the proportion of the time when the scheme is operating at maximum flow will be greater due to the level of flow used against what is available. I estimate a Revenue potential of $\pounds 80,000$ per year. This will be more accurately known when the full flow duration data and levels data is known.





The Export Tariff is paid for the electricity not used by the Sustainability Centre. Obviously this is not paid for the power consumed by the Centre but at the same time 14.5p /kw has not been paid to the electricity supply company for imported electricity. The saving of 10p /kw has not been included in the potential revenue figures.

The generation will be three phase and will require witness testing by the ENA/DNO and is covered by G59/2 regulations.

There is one stage to be completed together before the project can progress. This is to follow the Environment Agency Pre-application process. The pre-application process entails about 3 day's work at £480/day, there will probably be a requirement for a visit to site with EA. The proposal will in all require an Abstraction License and a Consent for Works / Flood Defence Consent as it is within 8 metres of a watercourse.

The EA should be involved at the earliest stage. Involving the EA will determine if there are any show stoppers. I do not anticipate any major challenges. Once the pre-application process has been completed we will have a better understanding of the way forward. A report will be produced by the EA with their response to the pre-application.

On the day of the visit it was decided that we should proceed with the Pre-application Process. A copy of the application will be sent to you when it is complete.

Brendan Barrow
19th February 2014

