

# Hydropower on the Thames

External briefing - Final

September 2014v2

**This is a short brief to answer some of the questions being raised about the design and approval process involved with Teddington Hydropower Scheme.**

## Teddington Weir

### Scheme design

The original proposal for the hydropower scheme presented by Teddington & Ham Hydro Cooperative Ltd in 2010 was a design for four Archimedes screws alongside a Larinier fishpass.

This scheme was reduced to three screws, a Larinier fishpass and a flood control gate. This change was necessary to ensure the proposal did not increase flood risk through provision of a deep flood control gate.

*The design has remained unchanged in terms of key components since 2011.*

The structure was moved out of the weirpool due to constraints placed on the design by the industry accepted standards (See fishpass below).

This does not make the scheme 'over-sized', it simply moves the position of the turbines upstream. The 2.68m fall over the weir requires approximately a 7.5m long bladed section of the Archimedes screw. The other consideration is the flood level. The screw shaft needs to be extended to bring electrical equipment above the design flood level. This is required to avoid unnecessary flooding to sensitive equipment.

*The aesthetic design of the scheme has been updated to better fit with the existing weir structure. The changes take architectural cues from the roller sluice gates to be in-keeping with the adjacent structure.*

### Why not build on the overspill weir?

The overspill weir section has a maximum width of around 5m. The bladed section of screw is longer than the available width. When the additional equipment is added such as the gearbox, generator and control gates, the structure required is nearer 35m. This would project too far into the navigational channel. The navigation channel approaching the lock adjacent to the overspill weir is only 25m wide. Even a smaller, more compact design would impinge on the navigation to an unacceptable level. It would also create a 'draw' perpendicular to the boat traffic at a point where boats are potentially slowing to approach the lock.

The overspill weir section is also remote from the existing fish passes. Best practice requires the fish pass and the turbine exit to be alongside each other. The overspill weir is not the best location for a fish pass based on the on the design guidance we adopt.

*The most suitable place for the fish pass and the hydropower unit is adjacent to the Teddington bank as proposed by the current scheme.*

### Flood Risk Assessment

A Flood Risk Assessment (FRA) was completed in November 2011 by AMEC UK Ltd. The Environment Agency have reviewed the FRA and accepted it as suitable for the proposed design.

*The risk of flooding is not increased by the proposed hydropower scheme.*

The hydropower scheme proposed to be installed within Teddington Weir on the River Thames at Teddington is located within Flood Zone 3. As such the National Planning Policy Framework requires a Flood Risk Assessment (FRA) to be undertaken and submitted as part of the planning application. The FRA reports on the assessment of flooding from all sources on the proposed scheme and the potential impacts of the scheme on flood risks elsewhere.

*The design changes to the scheme do not alter flood risk and the 2011 FRA remains valid. This will be confirmed as part of the planning application process.*

## Noise

Noise levels and approval is dealt with by the planning process. We have viewed a number of schemes and seen methods that reduce noise. This is standard practice for hydropower design. The Teddington & Ham Hydro Cooperative Ltd design includes acoustic covers to the generators and the lower section of the Archimedes screw. These two areas are considered to have the greatest potential to create unacceptable noise levels.

*We are satisfied that noise can be reduced to an acceptable level.*

## Environmental impact

A full Environmental Impact Assessment is not required. The Water Framework Directive requires an assessment to be undertaken to identify impacts on the environment as part of the planning and licensing process.

We have requested that the Teddington & Ham Hydro Cooperative Ltd undertake a range of studies to provide evidence of weirpool habitat. Based on the information we have, the licensing process will apply constraints and measures to protect the weirpool environment.

We are satisfied that the weirpool habitat can be protected and that the hydropower scheme can be designed so that it will not have a negative impact on the environment. The flow constraints will protect gravel areas important for fish, and the provision of a better fishpass will increase migration opportunities for more fish species.

Impacts can never be fully known, however, we have received sufficient information to assess the likely effects of the scheme and provide controls on the development that will prevent harm.

*We will monitor construction and operation to ensure compliance with licences.*

## Fish Pass

The current fish passes at Teddington Weir are designed for salmon and sea trout. To provide opportunities for a wider range of fish species to migrate upstream a Larinier type fishpass is proposed.

*To maximise its effectiveness the fishpass must be constructed alongside the hydropower turbine exit.*

This is because the flow exiting the turbines will create an attraction flow for fish looking to travel upstream. By siting the fishpass immediately adjacent to the turbines and ensuring the fishpass itself has a suitable attraction flow, we can increase the likelihood that fish will use the fishpass.

*This design is based on good practice guidelines agreed across the industry.*

It is also important that the fishpass is sited on the left (Teddington) bank as this is the 'head' of the weirpool. Fish swimming either up the bank or within the weirpool will naturally arrive at this point and be drawn by the flow. Fish moving around the weir from the opposite bank will have a high likelihood of finding the fishpass too.

It is important that the toe (entrance) of the fishpass is in-line with the weir apron and turbine exit. If these were not in-line, fish would be required to drop back into the centre of the weirpool and may be deterred from pushing on to find the fishpass.

## Health & Safety

The hydropower scheme presents no greater risk to the boat users or the public in general than the existing weir. The position on the weir adjacent to the Teddington bank ensures that any draw from the turbine channel would not affect navigation routes.

*The safety barriers upstream of the weir will be upgraded and adapted to ensure protection by preventing river users from accidentally entering the area immediately upstream of the weir. The turbine channel itself will be protected by a trash screen which will prevent large objects entering the turbines.*

The scheme can only operate when flow is available. Flow is not created by the scheme but it will be concentrated through the turbines for part of the hydrograph. Once the turbines are at full capacity, any increase in flow will be passed through our weir gates as normal.

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incident hotline  
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floodline  
0345 988 1188  
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## The experimental nature of the scheme

The scheme proposed at Teddington is not experimental. Archimedes screws are simple enough technology and the design proposed at Teddington is a standard arrangement. There are numerous examples across the country of Archimedes screws successfully operating.

*Hydroelectric energy uses proven and efficient technology; the most modern plants have energy conversion efficiencies of 90% and above.*

The Romney design can be considered experimental in part through the use of a tilting screw arrangement. The developer confirms there is evidence to demonstrate a small generation benefit from the tilting mechanism. He also reports advantages for maintenance and noise reduction using the tilting mechanism.

*The tidal aspect of the scheme at Teddington is an economic consideration.*

For higher tides there will be a reduction in the opportunity to generate. This affects the financial viability of the scheme but presents no challenge for the existing technology.

*Were Teddington & Ham Hydro Cooperative Ltd to propose an innovative design to take advantage of the tidal range, this would be potentially experimental.*

## Planning Application

The original planning application has been with the council for some time. The main reason for the delay came from our belief that additional data was required to fully assess the impacts on the weirpool.

*At the same time, we advised Teddington & Ham Hydro Cooperative Ltd and the council that we required detailed habitat and species data before we could proceed with a Water Resources licence application.*

The planning application has not gone to Planning Committee for it to make a decision. This does not mean the Council's Planning Team has rejected the scheme. Following discussion, we had determined the best location for an eel pass would be at the opposite end of the weir. This has led to an issue as that section of weir is not included in the 'Red line' plan submitted with the original planning application.

The council advised that the eel pass must be included and therefore a new application would need to be submitted with the eel pass included in the plans.

*The new planning application is required to include the eel pass and it is a good opportunity to update the information and design details to ensure clarity for those interested in the scheme.*

## Future viability

The scheme will be assessed for viability by Teddington & Ham Hydro Cooperative Ltd.

The future of the scheme is something that we have considered.

Our legal team are writing a lease that makes provision for a Step-In Agreement should Teddington & Ham Hydro Cooperative Ltd default in some way. The Lease is expected to be for 40 years which provides Teddington & Ham Hydro Cooperative Ltd with a secure position to base their financial projections.

*All guarantees and indemnities that are required for the construction, delivery and operation of the scheme will be sought. We are committed to ensuring risk associated with these schemes is managed.*

## River Thames Scheme

*The Hydropower proposal will not impact on the progress of the River Thames Scheme, which seeks to reduce flood risk for a large section of the Thames floodplain upstream of Teddington weir. Modelling assessments are being done for the scheme, with capacity likely to need to be increased at the weir.*

*The design work for the increase in flow capacity required at Teddington weir is only at an early stage, however, the indication is that the most suitable location will be on a 40m length of the overspill weir. This means the proposals for hydropower and those to reduce flood risk can exist together.*



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