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# Low-head Hydropower Expression of Interest – Phase II

for the private development of low-head hydropower on a selection of Environment Agency owned weir structures on the River Thames

We are the Environment Agency. It's our job to look after your environment and make it **a better place** - for you, and for future generations.

Your environment is the air you breathe, the water you drink and the ground you walk on. Working with business, Government and society as a whole, we are making your environment cleaner and healthier.

The Environment Agency. Out there, making your environment a better place.

**Published by:**

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# Foreword

## Development of low-head Hydropower within the South-East

The Environment Agency supports sustainable hydropower development for the provision of renewable energy generation. We are actively promoting opportunities for private 'developers' to scope, design, build and operate hydropower schemes on Environment Agency owned assets (weir sites) on the River Thames under a leasing arrangement.

Following last years Expression of Interest for Teddington, Sunbury and Bell Weirs, three further weir sites have now been identified as development opportunities along the non-tidal Thames. The chosen sites are; Marlow, Boveney and Boulters weirs on the River Thames in Berkshire, within the Royal Borough of Windsor & Maidenhead.

This document invites developers with an interest in developing schemes on these Environment Agency owned assets to respond. Expressions may be submitted for one, two or all of the identified sites. All expressions will be evaluated by the Environment Agency and a preferred developer selected for each site.

Stephen Naylor      Hydropower Project Manager

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# Background

Achieving our climate change targets will require a massive shift from unabated combustion of coal, oil and gas to renewable energy and other energy technologies with very low greenhouse gas emissions. The UK is committed to generating 15 per cent of its energy from renewables by 2020, and the Committee on Climate Change advises that the electricity sector needs to cut its net emissions of carbon dioxide almost entirely by 2030.

Hydropower produces 1.2 per cent of electricity consumed in the UK. The potential to increase this is limited, but there is some potential for the expansion of small-scale 'low head' hydropower. This could make a small but useful contribution to our energy mix. Hydropower schemes can, however, threaten fish populations and other aspects of river ecology, both through direct damage to fish if they pass through a turbine and where it leaves reduced flows in the river and can increase flood risk or adversely affect land drainage if not properly designed.

The Environment Agency is a statutory regulatory body and owner of a large number of fixed assets throughout England. In recent years there has been increasing interest in the development of low-head hydropower schemes on lowland rivers in England.

Hydropower schemes require a number of permits and consents issued by the Environment Agency, including an abstraction and/or impoundment licence and flood defence consent. We also have a regulatory duty to ensure that schemes are in compliance with environmental regulations such as the:

- Water Framework Directive - the freedom of movement of fish, upstream or downstream, is an important component of achieving or maintaining good ecological status.
- Salmon and Freshwater Fisheries Act (1975) – we are required to maintain, improve and develop all freshwater fisheries, and to ensure the free passage of migratory salmon and sea trout.
- We have published good practice guidance (GPG) for use by developers and Environment Agency staff that describes how these environmental concerns can be accounted for in hydropower schemes.

In line with the National position and Regional Policy, the Thames Region of the Environment Agency is keen to facilitate opportunities for private developers to develop sustainable hydropower schemes on a number of selected assets. This follows on from the on-going pilot development project at Romney Weir, Windsor, and last years public Expression of Interest for hydropower development at three sites on the River Thames in Surrey.

This document is an invitation for developers to express an interest in; Marlow, Boulton and / or Boveney, taking one, two or all of these sites forward to design, build and operate schemes. The chosen developer(s) will lease the site (development area only) and will be responsible for obtaining all statutory licenses, planning consent and other statutory approvals. The developer will also be responsible for stakeholder liaison. The Environment Agency will operate as Statutory Regulator and, under the terms of any lease, Landlord (asset owner). The Environment Agency will not be fettered from its statutory duty in facilitating a development on its own assets.

Responses to this expression of interest are requested in both hard (2 copies) and electronic copies (2 CD-ROM's) in unmarked envelopes no later than **midday on the 21 July 2011** and should be returned to:

Mr Stephen Naylor  
Environment Agency  
Kings Meadow House,  
Kings Meadow Road,  
Reading, Berkshire,  
RG1 8DQ

Following receipt and our evaluation, preferred developers will be called for interview week commencing **8 August 2011** with chosen developers selected by the **end August 2011**.

The remainder of this document provides further details of the requirements of this expression of interest and available information we believe necessary in responding to this document.

We look forward to reviewing the expressions of interest for these sites and to working together to facilitate and promote hydropower as a renewable energy technology.

# 1 Introduction

## 1.1 Roles & Responsibilities

As an owner of a large number of key infrastructure assets, the Environment Agency has a statutory duty to protect and improve the environment, and to promote sustainable development. In facilitating hydropower development at these assets we will be required to act as both Environmental Regulator and site Landlord (under the terms of a future lease).

The Environment Agency's position as a regulatory authority and as Landlord under any leasing agreement are separate and distinct. Actions taken in one capacity are deemed not to be taken in the other. Where statutory consents must be obtained from the Environment Agency in its capacity as a regulatory authority, the developer is responsible for obtaining these and paying fees. The Environment Agency's acceptance of designs/ proposal/agreements, etc, as Landlord does not constitute statutory approval or consent.

Chosen developers will be expected to comply with all statutory consents, licenses and approvals (both Environment Agency and non-Environment Agency); this includes the requirements of the hydropower permitting process. The permitting process will be the same for developments on our own sites as for any other hydropower application and will be considered without prejudice.

The development process will be facilitated through a leasing arrangement between the Environment Agency (Landlord) and the selected developer (Tenant). Both the development process and future leasing arrangements are explained further in section 1.2.

Developers will be responsible for all aspects of scheme development, from concept design, detailed design through to construction, operation, maintenance and de-commissioning at the end of the agreed lease period. The developer will 'own' the electricity generated and will be free to sell to the national grid and / or a third party purchaser. The developer will pay the Environment Agency a rent for use of the site.

Costs associated with progress of the development that are outside of our statutory regulatory remit are to be **borne by the developer**. Further details of these estimated costs are included within section 5.

This document is a request for interested developers to respond with outline proposals and developer company / organisation details to enable us to select a preferred developer for each site.

## 1.2 Development Gateway Process & Leasing Arrangements

The Good Practice Guidelines for developers can be found on the Environment Agency website and provide guidance for potential hydropower developers <http://www.environment-agency.gov.uk/business/topics/water/126571.aspx>. These guidelines are appropriate for all low-head hydropower schemes.

In addition, in South East Region we have prepared a 'typical' development gateway process for schemes on our assets. This development process includes future leasing arrangements, design and construction related review stages, in addition to the statutory permitting process. Specific developer gateway approval stages have been identified. As each site and each scheme must be assessed on its own merits, we do reserve the right to amend this development process where circumstances demand; changes will be agreed in advance with developers.

In summary, the development gateway process includes the following:



Gateway 1: Expression of Interest (Developer evaluation stage)  
Gateway 2: Operating Agreement, Schedule of Responsibility & Pre-application EA licensing  
Gateway 3: Leasing arrangements  
Gateway 4: Statutory Permitting & Consents  
Gateway 5: Planning Process  
Gateway 6: Detailed Design Phase  
Gateway 7: Pre-construction Phase  
Gateway 8: Construction, Commissioning & Handover  
Post Construction Stage: Resolution of Defects

This Expression of Interest stage is known as 'Gateway 1'; as follows:

- Interested developers prepare and submit responses to the Expression of Interest
- Environment Agency review and evaluate responses and choose preferred developers for interview
- Chosen developers selected for each site following interview stage
- Site exclusivity (for hydropower development) agreed between the parties (developer and the Environment Agency).

A copy of the development gateway process has been included at Appendix G.

## 1.3 Agreements & Approvals

### 1.3.1 Operational Agreement

The developer and the Environment Agency will work to define an operational agreement for the scheme which will be included within leasing arrangements. This agreement will include (but not be limited to) the following:

- Operation & Maintenance of the scheme
- Monitoring of the scheme (inc. flow monitoring)
- Operation & Maintenance of Existing Asset (weir)
- Environmental Monitoring (inc. ecology & fish)

The operational agreement containing the operational detail of the scheme will be included within both the leasing documentation and abstraction license (as may be required). Requirements for management of any abstracted flow will be included within this documentation.

### 1.3.2 Statutory Licenses & EA Approvals

Developers must prepare applications which comply with all regulatory legislation. Hydropower schemes will usually require the following permits and consents from us:

- an **abstraction licence** - You need the Environment Agency's agreement for the amount of water your scheme can take from the river to flow through a hydropower turbine.
- an **impoundment licence** - Any new or raised weir will change the water levels and flows in the river by impounding more water above it. The Environment Agency will need to agree these changes with you.
- **flood defence consent** - You need the Environment Agency's agreement for any works in or near rivers that have the potential to increase flood risk. This will include both the construction works and the finished scheme.

We have to ensure that hydropower schemes will not increase flood risk, damage ecology or the fish population or obstruct fish migration. Proposals must comply with environmental regulations

including the Water Framework Directive and the Salmon and Freshwater Fisheries Act (1975), which highlight the importance of fish migration.

The licensing process, in relation to hydropower, is explained within the Good Practice Guidelines and on our website <http://www.environment-agency.gov.uk/business/topics/water/126571.aspx>.

### 1.3.2.1 Planning Permission

Hydropower developments do not fall under the Environment Agency's permitted development rights of the Town and Country Planning (General Permitted Development Order) Act 1999 and therefore would usually require planning permission. Developers will be required to consult the Local Planning Authority to determine whether planning consent is required.

It is important to contact the local planning authority (Royal Borough of Windsor & Maidenhead) to discuss your plans at an early stage. They will consider issues such as flood risk, physical appearance of any buildings, ecology, landscape, amenity and archaeology. Developers are however asked not to make contact at this time until formally selected following this tender process.

It will be the responsibility of the developer to obtain a satisfactory Planning consent. The Environment Agency is a statutory consultee to the local authority for planning applications.

You will have to provide a Design and Access Statement and other information with your application including a Flood Risk Assessment for works at these sites. If the potential impact on the environment is considered significant enough, you may have to prepare an Environmental Statement to go with your planning application. This should include the information the Environment Agency needs to decide which permits to issue. The local planning authority will consult with other people who may be affected by the scheme and the application may be decided by a Planning Committee of elected Councillors.

### 1.3.2.2 Flood Risk

It is an Environment Agency requirement that the existing flow capacity is maintained at all sites. Developers will be required to outline in their returns how they propose to mitigate any increase in flood levels. During the development process the developer will be required to undertake a Flood Risk Assessment to demonstrate that proposals do not increase flood risk. Flood Risk Assessments are a requirement of the statutory planning process. Specialist flood risk consultants will be required to undertake this exercise.

### 1.3.2.3 Environmental Issues

In order to determine the impact of any proposals an Environmental Statement will likely be required. It is likely that this will be a requirement of the statutory planning process. Specialist environmental consultants will be required to undertake this exercise. Developers should consult the Environment Agency prior to undertaking any works to ascertain existing information already held that could be utilised.

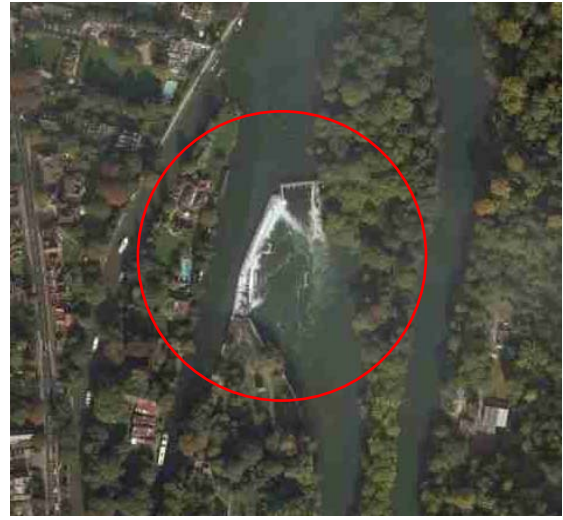
For many schemes, the Environment Agency will require developers to install a fish pass to allow fish to pass safely up and down the river. This will depend on the scheme proposals but should be considered / allowed for by developers at this stage.

## 2 Development Opportunities

The following sites have been allocated as potential development opportunities. These are weir sites located at Marlow, Boulters and Boveney on the River Thames. Site ownership and constraints plans have been included within Appendix B.



Marlow Weir  
Grid reference: 85270 86132



Boulters Weir  
Grid reference: 90382 82762



Boveney Weir  
Grid Reference: 94452 77687

The above sites are being promoted in partnership with the Royal Borough of Windsor & Maidenhead (RBWM) in response to calls from the Borough for renewable energy opportunities.

These sites have been screened by the Environment Agency and the findings have been included here for reference and are provided to assist interested developers in their submissions. These issues are not exhaustive and developers will be expected to undertake further work in identifying key issues once proposals have been developed. A copy of the screening comments has been included at Appendix D.

## 2.1 Available site information

The nominal head of water at each weir and details on indicative flow rates are given in the table below. This information has been provided from Environment Agency records; for indicative purposes only.

**Table 1: Flow & Head Information**

	<b>MAF (m<sup>3</sup>/s)</b>	<b>Q50 (m<sup>3</sup>/s)</b>	<b>Q95 (m<sup>3</sup>/s)</b>	<b>Av HEAD difference u/s to d/s (m)</b>
Marlow Weir	56.14	39.33	14.44	2.0m
Boveney Weir	49.21	33.59	11.30	1.3m
Boulters Weir	50.31	34.34	11.55	2.1m

Information on each of the weir structures is available in the form of Weir Miniatures, in Appendix C, and flow duration curves for each of the weirs are provided at Appendix E.

Specific points to note:

### Flood Duration Curves:

Flood Duration Curves have been provided for each site. To assist potential developers at this early stage, each chart includes a **maximum 'illustrative potential' flow** that may be available to a hydropower scheme. This is indicative only, to illustrate the potentially available flow at the site based on a Hands off Flow of Q95. Each site will be looked at on its own merits, taking into account specific site constraints, such as, ecological constraints or existing abstractions that may further limit the available flow at the site. Once developers have been selected for each site, an agreed available flow will be determined based on site specific factors.

### Weir Miniatures:

It should be noted that two drawings have been provided for Boulters Weir. Since drawing RTW12 was produced a part of the weir structure has been refurbished at the northern end. The 10 buck gates and 3 radial gates, as shown on RTW12, were replaced with 6 split buck gates and a fish pass. The new arrangement is shown on drawing reference SE-2128-105.

# 3 Development Process

The Environment Agency has published Good Practice Guidelines for potential hydropower development on its weirs<sup>1</sup>. Any potential developer should refer to this document to assist them in the development of their hydropower proposal and initially in responding to this Expression of Interest.

*“The Environment Agency has wide ranging responsibilities set out most particularly in the Environment Act 1995, Water Resources Act 1991, Land Drainage Act 1991, Salmon and Freshwater Fisheries Act 1975 and the Water Framework Directive (WFD) which came into operation in 2004. Section 4 of the Environment Act requires us, in discharging our functions, to contribute to the objective of achieving sustainable development.”*

Extract from the Good Practice Guidelines

The Good Practice Guidelines cover the following topic areas:

- Environmental Site Audit
- Hydropower Site layout
- Ecological Requirements
- Hydropower Scenario's
- Permitting
- Abstracted flow regime & flow in the depleted reach
- Flow Monitoring
- Fish Passage
- Fish Screen Requirements & Design

In addition, the British Hydropower Association website (<http://www.british-hydro.org>) is a useful source of information and / or contacts.

Further guidance given in this section highlights regional specific requirements and considerations to aid developers in responding to this Expression of Interest.

## 3.1 Regional Considerations

In addition to advice and guidance provided within the national Good Practice Guidelines document, further supplementary consideration and guidance for the South East Region is provided in this section.

In addition, a South East Region specific Development Gateway Process is provided which provides an indicative forward look through the 'typical' development process and outlines timescales for a 'typical' development programme. All prospective developers will be expected to comply with the stages identified in this gateway process. A copy of the gateway process can be found at Appendix G.

### 3.1.1 Preferred Technology

The South East Region of the Environment Agency has identified Hydrodynamic (Archimedes) Screws as the preferred form of technology for future hydropower schemes on our sites. These turbines have demonstrated in recent trials to be more 'fish friendly' than alternative options. Archimedes screws are referred to within the Good Practice Guidelines as 'low impact' in

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<sup>1</sup> Environment Agency (2003) *Good Practice Guidelines Annex to the Hydropower Handbook* [Online] Available from: <http://www.environment-agency.gov.uk/business/topics/water/126571.aspx>

comparison to alternative technologies. Any developers considering proposing an alternative form of technology (from the Archimedes Screw) will be required to satisfy us in respect of its decision to do so and to confirm compliance with all necessary mitigation measures as identified within the Good Practice Guidelines.

Mitigation measures will be set by the Environment Agency for the proposed scheme and will include, but not be limited to, a minimum residual flow, screen requirements, and fish passage improvements; potentially through the installation of a new fish pass. Whilst we acknowledge Archimedes Screw as a 'low impact' technology, there will still be a need for environmental mitigation measures as outlined in the Good Practice Guidelines and through relevant Environmental Regulation.

### 3.1.2 Residual Flow Requirements

Based on the developer's proposed design a residual flow (i.e. the flow not available to the turbine over a range of conditions) will be established, on a site by site basis, by the Environment Agency. Due to potential negative impacts on local geomorphology and fish passage, and to protect navigation, an agreement on the appropriate distribution of flow between the turbine and the residual flow requirements are key aspects for each site.

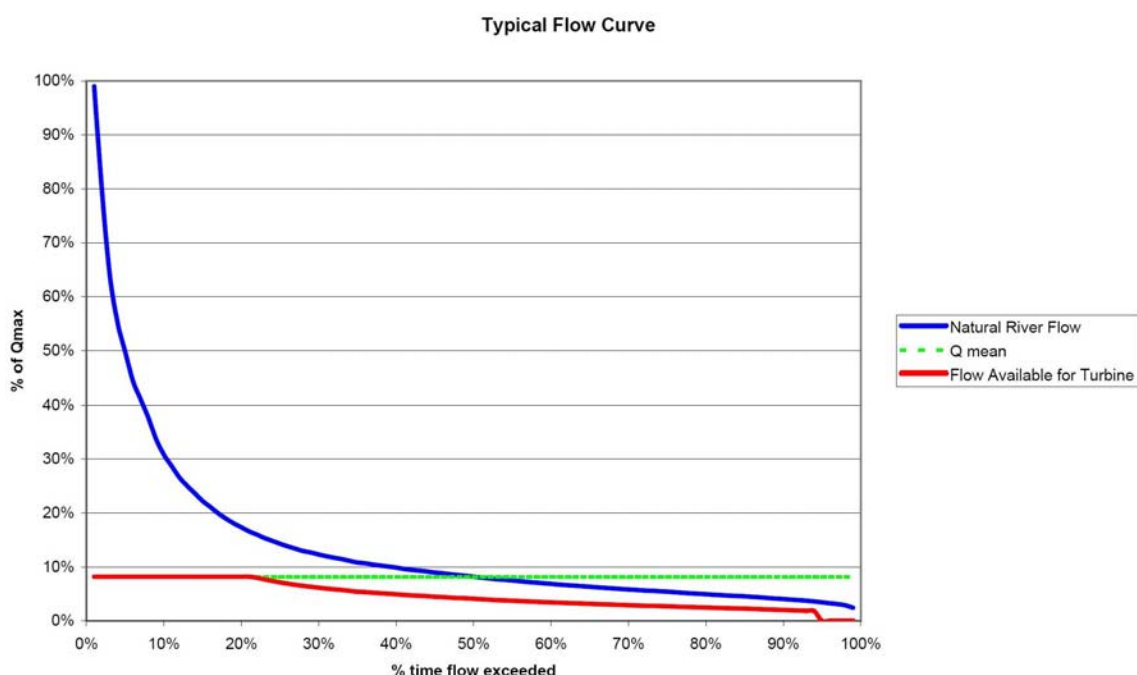
Whilst decisions are based on local conditions, as a 'rule of thumb' (and for the purposes of this exercise) the developer should work on the basis that a 50%:50% split of flows between the turbine(s) and the existing channel will be required, with a maximum flow of  $Q_{mean}$  through the turbine. Further details of this are provided within the Good Practice Guidelines.

Once the flow has dropped to the Q95 flow figure and below, the developer will be required to cease operation of the turbine(s).

Other factors may affect the level of residual flow at specific sites based on the proposed development; again these are further explored within the Good Practice Guidelines.

Figure 1 below is provided to illustrate the typical approach used to determine the available flow to any hydropower scheme:

**Figure 1: Typical Flow Curve showing Residual Flow**



### 3.1.3 Flood Risk

Flow capacity must be maintained at the site with no increase in flood risk. Ultimately, a flood risk assessment will be required to demonstrate the flood risk impacts of each proposal. We do not require a flood risk assessment for the Expression of Interest phase however demonstration as to an understanding of the possible impact on the design is essential. If it is determined (through modelling) that there is an increase in flood risk at the site then the developer will be required to provide on site compensatory capacity flow measures. Developers should consider the potential impacts on any scheme and take external expert advice where necessary before submitting proposals.

### 3.1.4 Environmental Issues

For each development we will require environmental studies to be undertaken. If a scheme requires planning, as determined by the Local Planning Authority, then an Environmental Statement will be required as a part of any planning submission.

The Environmental Statement should cover, in particular detail, issues relating to geomorphology, fisheries, flood risk, ecology and navigations. Contact with local area colleagues will be necessary at early stages as survey and reporting requirements will be site specific.

#### 3.1.4.1 Geomorphology Issues

There remains concern about the depletion of energy on the geomorphology of weir pools and hence the ecology. This is of particular interest as weir pools are important habitats on lowland rivers; including the Thames.

The invertebrate community found in the lower freshwater Thames is important due to its high diversity value and the presence of many notable species.

The developer will be required to demonstrate that their proposals will have minimal effects on the geomorphology; the flow regime will be agreed with this in mind.

#### 3.1.4.2 Fisheries Issues

There have been concerns raised about possible impact on fish migration due to the unwillingness of fish to pass through a turbine(s).

Where there is an existing upstream fish pass the effectiveness and efficiency of that pass must either be maintained or improved as a result of a change to the site including hydropower developments. Where a fish pass is present it may be considered to be a part of the residual flow.

On migratory salmonoid rivers, or designated recovering and rehabilitating salmonoid rivers, where there is currently no fish pass, one will be required. On other rivers a fish pass may be required where it is considered that any reduction in fish passage may cause deterioration in ecological class status (with reference to the Water Framework Directive – the Good Practice Guidelines explain the impact in context of a hydropower development). Discussions as to these requirements should be undertaken at an early stage once a developer has been selected for a site.

Where a fishpass is already present, or where one is to be constructed as a part of the scheme, the entrance to the downstream fishpass and the turbine(s) discharge should be co-located. The increased turbulence of the turbine is believed to enhance attraction to the vicinity of the pass; hence the need to site schemes and fish passes adjacent one another.

If in the unlikely event that it has been determined, through discussion with us, that a fish pass is not required, we may require sufficient flow is left unallocated (to the hydropower scheme) and a suitable location reserved for the installation of a future fish pass.

### 3.1.5 Scheme Monitoring

The developer will be required to provide a suitable control and monitoring system that ensures flow is controlled, monitored and data recorded to demonstrate compliance with agreed licence conditions. The detailed method by which flows or levels are measured and recorded should be agreed with the Environment Agency but provided by the developer as an integral part of the scheme.

The developer will be required to install and maintain devices to measure and record the real-time flow of water at the site, including both flow through the turbine(s), and any residual flows to the reasonable satisfaction of the Environment Agency. The developer's installed equipment must be capable of connecting to our telemetry system. We shall allow the developer real time access to the information obtained from their flow gauges and telemetry system.

### 3.1.6 General Comments

The following comments are applicable to all development sites and should be taken into consideration for hydropower development:

Any disruption or temporary diversion of the Thames Path National Trail during the construction phase will need to be discussed with the relevant council and National Trails. Approval will be required for any temporary diversions of the Thames Path National Trail.

The Environment Agency's Landscape Department should be consulted over design, which should follow the guidance given in the Thames Environment Design Handbook and Heritage Audit.



# 4 Expression of Interest (EoI) Requirements

## 4.1 Time Scales

All interested parties must return responses to this expression of interest in both a hard (2 copies) and electronic copies (2 x CD-ROM) in unmarked envelopes to:

Mr Stephen Naylor  
Environment Agency  
Kings Meadow House,  
Kings Meadow Road,  
Reading, Berkshire,  
RG1 8DQ

Responses to be received no later than **midday on the 21 July 2011**; responses received after this time will not be considered. Following receipt of the returns, an assessment will be made and 'preferred' developers will be called for interview week commencing **8 August 2011**. Final developer selection will be made by the **end August 2011**.

## 4.2 Instructions for developers

Developer evaluation will be a two stage process. Stage 1 is the developer submission stage and selection of a developer; stage 2 is an interview process and final developer selection for each site. Detailed instructions for developers are contained at Appendix A. Developer responses are required in two parts; a scheme 'proposal submission' and 'company / organisation information'.

The 'proposal submission' will account for 60% of the evaluation criteria and requires the following outline information:

- Development Proposals
- Development Programme
- Development Costs
- Commercial Arrangements
- Lease Arrangements
- Project Risk
- Scheme Benefits

The 'company / organisation information' will account for 40% of the evaluation criteria and requires responses to questions set under the following headings:

- Company / organisation details
- Relevant Experience & Project Team
- Sustainability & Ethical Policy
- Health & Safety

Developer's submissions will be reviewed (stage 1) on receipt and preferred developers selected for the interview stage (stage 2). The following criteria will be assessed by the Environment Agency when considering the suitability of development partners for short-listing. It should be noted that these criteria are not in a priority order:

- Technical Merit & Quality
- Relevant Experience

- Business & Financial Standing
- Approach to Health & Safety
- Commitment to Sustainability, Environmental and Ethical Policies
- Commercial arrangements

## 4.3 Next steps

Following the selection of a preferred developer for each site, an exclusivity agreement will be entered into by both parties, securing hydropower development rights at the site for a period of up to 24 months (period based on Environment Agency discretion). During this period, the developer must demonstrate scheme progress against an agreed timescale. This 'progress' will be measured against milestones within the 'developer gateway' process.

Site exclusivity, for hydropower development, will be formalised with an in-principle terms of agreement between the parties. This is a precursor to leasing arrangements between the Environment Agency and the developer.

# 5 Costs payable by the developer

## 5.1 Environment Agency staff costs

Developers will be required to cover reasonable costs incurred by the Environment Agency in facilitating the scheme development. Reasonable costs are defined as “those outside of the normal duties in complying with statutory regulatory requirements”. Costs payable by the developer will include activities related to facilitation of the site development only. These will include:

- landlord project management & co-ordination – general developer / Environment Agency liaison
- independent design review (refer to gateway process for role of independent design check engineer)
- the Estates department

Developers will not be liable for costs relating to:

- legal services in connection with the leasing arrangements
- staff time relating to Permit / statutory applications and other statutory regulatory requirements

Costs will be charged on a ‘time expended’ basis. To allow developers to estimate commercial impacts the following ‘typical’ costs have been identified:

### **Landlord Project Management & Co-ordination**

This is likely to be an average of £1,000 per month throughout the gateway process. The cost per month will fluctuate depending on the project stage, overall complexity and the related effort required.

### **Independent Design Check Engineer**

Total costs around £25,000. This includes independent reviews of developer’s proposals at each design and construction stage.

### **Estates Department**

Total costs around £10,000. This cost includes for internal and external support in facilitating the leasing and commercial arrangements.

## 5.2 Environmental Monitoring costs

Developers will be required to contribute to pre and post development monitoring works (up to a value of £10,000 per study). These studies will be used to gather evidence from each scheme as to the impact of the schemes to improve our understanding of the hydropower impacts.

## 5.3 General payment arrangements

Once selected, developers will be liable for reasonable Environment Agency staff costs, as outlined previously. Developers will be informed in advance as to who will be working on their project and their estimated level of input. Developers will be invoiced on a monthly basis by the Environment Agency along with a schedule of time spent against key activities. Payment terms will be 28 days. Details will be included within the initial in-principle terms of the agreement..

# Abbreviations

Abbreviation	Definition
MAF	Mean Annual Flow
Q40	River flow that would be exceeded 40% of the time
Q50	River flow that would be exceeded 50% of the time
Q95	River flow that would be exceeded 95% of the time
Qmean	Average of all river flow measurements over a period
RES	Renewable Energy Strategy
SAC	Special Area of Conservation
SAM	Scheduled Ancient Monument
SNCI	Site of Nature Conservation Interest/ Importance
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
WHS	World Heritage Site
WRA	Water Resources Act 1991 (c. 57) [Online] Available at: <a href="http://www.opsi.gov.uk/ACTS/acts1991/Ukpga_19910057_en_1.htm">http://www.opsi.gov.uk/ACTS/acts1991/Ukpga_19910057_en_1.htm</a>

# References

Environment Agency (2003) Good Practice Guidelines annex to the hydropower handbook [Online]  
Available from: <http://www.environment-agency.gov.uk/business/topics/water/126571.aspx>.

# Freedom of Information

The Environment Agency may be required to release information in order to comply with its statutory duties under the Freedom of Information Act 2000 and/or the Environment Information Regulations, and may also include some information under the Publication Scheme that it maintains under the Act. The Environment Agency will endeavour to contact the developer before such information is released.

**Would you like to find out more about us,  
or about your environment?**

**Then call us on  
08708 506 506 (Mon-Fri 8-6)**

**email  
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