The development of hydro-electric schemes
The Development of Hydro-Electric Schemes in Cornwall

This guidance document has been prepared to assist all parties involved in the renewable energy development process. It is intended that the guidance document will be adopted by the Council as a “Supplementary Planning Document” following the adoption of the Council’s Core Strategy proposed after 2013. Until then the status of this document is that it has been approved by Members of the Council’s Planning Policy Advisory Panel and while it will not attract the full weight of an SPD document will attract some weight in decisions reached on planning applications.

Introduction

This draft guidance note aims to provide planning advice in respect of the appropriate location and siting of hydro-electric schemes in Cornwall. The guidance is aimed at proposals for all sizes/types of hydro-electric schemes. The level of information and detail that would need to accompany any planning application will clearly be dependent upon the size and location of the particular hydro-electric proposal and this is reflected in this guidance.

The Government has set targets to increase electricity and/or heat generation from renewable sources. Cornwall Council is keen to promote the generation of electricity and/or heat from renewable sources in Cornwall in order to contribute towards a more sustainable future.

This guidance note is part of a series of planning guidance notes for Renewable Energy prepared by Cornwall Council. Other guidance notes include.
1. <50kW solar PV and solar thermal
2. >50kW solar PV
3. Onshore wind
4. Anaerobic Digestion
5. Hydropower
6. Biomass (available soon)
7. Heat pumps (available soon)
8. Deep Geothermal (available soon)
9. Advanced Energy from Waste (available soon)

These guidance notes will be regularly reviewed and updated and can be viewed on our website at www.cornwall.gov.uk/renewableenergy

We hope that you find this planning guidance useful but if you have any queries please do not hesitate to contact the Planning and Regeneration Service at planning.county@cornwall.gov.uk or ring 0300 1234 151.

We continuously seek to improve the quality of the advice and guidance that we offer and we would be happy to receive comments, suggestions or images which may improve this guidance document.
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Rivers in Cornwall

There are approximately 4000km of river in Cornwall, of which 3,250km are classed as ‘Ordinary watercourses’ (under the responsibility of Cornwall Council), and 750m are classed as Main Rivers (under the responsibility of the Environment Agency).\(^1\)

Being a peninsular, nowhere in Cornwall is far from the sea, meaning rivers tend to be relatively short in length and have small catchments, which respond quickly to rainfall events.\(^2\) Also, the topography of Cornwall with its higher upland interior tends to create rivers with more ‘flashy’ flow regimes.

In most cases the rivers flow through farms and woodland and in some cases past mills before they reach estuaries.

Hydropower in Cornwall

Prior to the advent of steam power many of Cornwall’s industrial businesses were powered by water in the form of river or leat based water wheels and a number of tidal mills were in operation. These installations harnessed the power of the water to drive mills, workshops and pump water from the mines. It has been suggested that, over the centuries, there may have been as many as three thousand mills operating throughout Cornwall.\(^3\)

With the advent of the industrial revolution, steam power made this technology redundant and the further development of the national electricity grid and gas network in the 20th century saw all the water mills cease to be commercially viable.

With the need to produce more renewable energy in the form of electricity the potential of harnessing hydropower (energy derived from the flow of water) once more in Cornwall has arrived.

A DECC study\(^4\) considers that there are potentially 322 sites in the south west which can offer a potentially viable hydro power solution with the capacity to generate 20 – 30 MW of potential energy.

This guide seeks to encourage the installation of such schemes in Cornwall at appropriate locations.

\(^1\) Preliminary Flood Risk Assessment, Cornwall Council, June 2011
\(^2\) Ibid
\(^3\) Benney D E ‘An introduction to Cornish Watermills’ (1972).
\(^4\) England and Wales Hydropower Resource Assessment, DECC, October 2010
Types of hydro-electric scheme

Water power is a combination of ‘head’ and ‘flow’. These are both required in order to generate electricity. Head is water pressure or the vertical distance between the water intake and the turbine itself. It is usually defined as vertical distance (metres) or pressure (psi). Flow is the quantity of water and is expressed as ‘volume per time’, such as gallons per minute (gpm), cubic feet per second (cfs) or litres per minute.

There are three main types of hydroelectric scheme;

**Pumped storage schemes:** These usually require a high level and a low level storage reservoir. At times of low electricity demand, or when electricity is abundant, energy is used to pump water from the lower level to the higher level storage reservoir. This water is released through turbines to generate electricity when demand is high. Such a scheme can be used in conjunction with more intermittent forms of renewable energy, such as a wind turbine, to smooth out the intermittency by providing a controlled form of energy storage.

**Storage schemes:** These require water to be impounded in a reservoir which feeds a turbine and generator.
Run of river schemes: Water is taken from a watercourse, usually involving a weir, with no facility for water storage, directed through a turbine and returned to the watercourse. These are the most likely hydropower schemes in Cornwall.

The role of the Environment Agency

The Environment Agency has a critical role to play in any hydroelectric scheme and, in particular, will need to consider the following impacts of any proposal;

**Abstraction** – the amount of water that can be taken from a watercourse to flow through a hydropower turbine.

**Impoundment** – any new or raised weir will change water levels and flows in the watercourse. The Environment Agency will need to agree these changes.

**Flood risk** – The Environment Agency will need to agree any works in or near watercourses that have the potential to increase flood risk.

**Fish passaqe** – A fish pass may be required to allow
What consents are required for a hydropower development?

The two main statutory approvals that are needed are:

1. Planning consent
2. Environment Agency permits

The planning consent determines if a scheme is an appropriate use of land, including the riverbed, taking into account a range of environmental and socio-economic factors.

The Environment Agency permits determine the design and operation of a hydropower scheme to deal with issues such as fish migration, water abstraction from rivers and flood risk.

The diagram below indicates that certain issues are of particular interest to both organisations and this is why this guide recommends pre-application discussions with each party at the start of any potential hydropower project.
Anatomy of a hydro power facility

**Intake:** Usually comprises a weir or dam across a watercourse in order to direct a regular supply of water towards the hydropower turbines. A section of the weir may be adjustable to regulate flow and a spillway ensures that some water continues downstream, avoiding the turbine and maintaining flow. A screen, or ‘trashrack’, prevents fish and/or debris entering the pipeline or channel that feeds the turbine. A settlement tank, or silt trap, may be required behind the weir in order to collect silt being carried downstream.

**Penstock/pipeline or headrace:** The pipeline (sometimes called the penstock) connects the intake with the turbine. These pipelines are normally buried and may require anchor blocks wherever there is a change in vertical or horizontal direction. An open channel, or headrace, is uncommon on new hydropower schemes but may occur if the development involves the use of an existing scheme.

**Turbine house:** The building or structure which houses the turbine, generator and any ancillary equipment. To minimise the length of the tailrace, and to maximise the available head, the turbine house is usually located close to the watercourse.

**Tailrace:** The channel which returns water from the turbine to the watercourse. The channel should have sufficient gradient to allow the flow of water, particularly when the level of water in the watercourse is high. The tailrace is usually underground and there is a screen to prevent fish entry.

**Grid connection:** The electrical connection between the turbine house and the electricity network. Application proposals should provide a broad indication of the route of connectivity to the electrical grid. Such connectivity should avoid areas of high landscape, ecological or archaeological sensitivity.
Planning for Energy Development in Cornwall

The development management planning function within Cornwall Council is structured within four different teams. These consist of three Area Planning Teams and the Natural Resources Planning Team. The Natural Resources Planning Team is responsible for drafting planning policy, guidelines and determining planning applications for hydro power throughout Cornwall. The relevant Area Planning Committees would normally determine any hydro power planning proposal, unless such a proposal can be considered using delegated powers.

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<td>Natural Resources Planning Team</td>
<td>Develops policy and guidance and determines hydropower planning proposals for hydropower across Cornwall.</td>
<td><a href="mailto:Planning.county@cornwall.gov.uk">Planning.county@cornwall.gov.uk</a> 0300 1234 151</td>
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Case Study 1; Cotehele Mill, St Donminic, nr Callington, Cornwall Ref E2/10/00018/FUL

Background

The proposed development was due to be located next to an existing mill that is owned by the National Trust. The National Trust wanted to use the existing river to generate electricity, but with the proposed development operating independently of the existing mill. The electricity generated would contribute to the overall target for renewable energy generated by the National Trust. The fall of the river is 7 metres, therefore providing a good opportunity to generate.

Issues and Mitigation

Good quality Salmonid river

Discussions with the Environment Agency led to the installation of appropriate fish screening and a piped fish bywash and integrated flood spillway. This demonstrates that with careful design the issue of migrating fish can be overcome.

Poor site access

Careful site management and use of appropriate machinery allowed the hydropower facility to be built with minimal disruption to the existing mill operation.

Noise

The location of the powerhouse upstream of the existing mill meant that noise was not an issue. Housing the turbine within the powerhouse further reduces any noise levels.

Visual Impact

The impact on the historic environment was mitigated by the use of construction materials, such as stone and wood, to match those used locally.

Case Update

Planning permission was granted in 2010; the scheme was commissioned in 2011 and is currently producing up to 5.5kW of electricity.
Getting Started

Before a hydropower project is prepared and developed there are a number of key questions that should be considered:

- Do you have ownership of all necessary land to develop the site?
- Would the hydropower plant be compatible with other uses and users of the river?
- Are there any environmental factors that may prevent the development?
- Does the water flow have the potential to generate sufficient electricity to make the project financially viable?
- Have you access to a suitable grid connection?

Much information has been produced by the Environment Agency to help with this initial phase of any hydropower project and where appropriate this guidance will be used in this document as will weblinks to relevant sources of information.
The flow chart below produced by in *Hydropower: A guide for you and your community* (a joint publication between Department of Energy and Climate Change, Environment Agency, Energy Saving Trust and the Welsh Assembly Government published October 2010) sets out the initial steps of any potential hydropower scheme.

**Where do I start?**

Do you think you might have an opportunity for generating hydroelectricity on your land or in your community? If so, follow these steps:

1. **Step 1** Find out if hydropower is suitable for your home or community
   - You can use the Home Energy Generation Selector on the Energy Saving Trust website www.energysavingtrust.org.uk/renewableselector/start/
   - If you would like to speak to an advisor, call the EST on 0800 123 012. Your local advice centre will talk you through the first stages of a possible project.

2. **Step 2** Talk to an approved installer
   - The EST can supply you with details of Microgeneration Certification Scheme (MCS) approved installers.
   - The installer will discuss your scheme in more detail and explain some of the options and costs. This will help you decide whether you would like to proceed.

3. **Step 3** Talk to the Environment Agency
   - Contact the Environment Agency on 08700 506 506 (Mon-Fri 8am-6pm) or email them at enquiries@environment-agency.gov.uk.
   - The Environment Agency will send you the Good Practice Guidelines checklist and a pre-application form to complete. These are also available on their website www.environment-agency.gov.uk/hydropower

4. **Step 4** Pre-application planning consultations
   - Consult your Local Planning Authority for advice about planning requirements at your site.
   - Consult the local community and other river users.

5. **Step 5** Grid connection
   - Consult your local electricity network operator for details of their requirements for connecting your scheme to the grid.

6. **Step 6** Full applications
   - You submit a full application to the Environment Agency, taking into account your pre-application discussions. This will include: abstraction licence, impoundment licence, flood defence consent and fish pass requirements.
   - You submit an application for planning permission to your Local Planning Authority.

7. **Step 7** Have the necessary permits and permissions been granted?
   - **YES** You can develop the scheme
   - **NO** You have further discussions with the Environment Agency and the Local Planning Authority.
The key starting point for any hydropower project is to get professional advice right at the beginning from a recognised hydro consultant. Details of such consultants are listed on the British Hydropower Association website. This site also contains a very comprehensive guide to “UK Mini-Hydro Developments” which includes much technical detail on types of hydropower technology.

The pre-feasibility study is essential and is money well spent for it can be the key to a successful hydropower project or determine at an early stage that a project is not viable and potentially save the developer/community time and wasted expenditure. If the initial study looks positive then a Hydroelectric power pre-application form will need to be submitted to the Environment Agency.

**Environmental Impact Assessment (EIA)**

Environmental Impact Assessment is a systematic process of identifying, predicting and evaluating the likelihood of significant effects of a development on the environment. In planning terms Environmental Impact Assessment has a specific connotation and will need to be considered carefully in the development process. Whether Environmental Impact Assessment is actually required will need to be evaluated on a case by case basis.

The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2011 include “installations for hydroelectric energy production” within Schedule 2(3)(h). Those with a generating capacity of over 500kW (0.5MW) must be screened for the need for Environmental Impact Assessment by the planning authority. Projects that lie within sensitive areas as defined in regulation 2(1) must all be screened as the Schedule 2 thresholds do not apply. Where a screening opinion is required, Schedule 3 to the Environmental Impact Assessment Regulations provides selection criteria for screening Schedule 2 development (see regulation 4(5)).

An Environmental Impact Assessment is often required by the Environment Agency as part of the application for an Abstraction Licence. Consultation between the Environment Agency and local planning authority at the scoping stage will minimise duplication of effort. In many cases, it is probable that one Environmental Statement will be sufficient for both purposes.

Any proposed hydropower facility, and its location, should therefore be carefully considered before any planning application is prepared and submitted, and to avoid any unnecessary delays it is recommended that a formal Screening Opinion be obtained from the Council.

**Obtaining a ‘Screening Opinion’ from the planning authority**

The Council is able and willing to provide formal confirmation of whether a hydropower proposal would need to be supported by an Environmental Statement (ES). This is known as a ‘Screening Opinion’. Please contact the Planning & Regeneration team for further details regarding this matter. A flow chart of the Environmental Impact Assessment Screening Procedures and the Screening Decision can be seen in appendix 4.

To find out whether a proposed hydropower facility would be located in a ‘sensitive area’ you can follow this link: Cornwall Council interactive mapping and search on
Environment for SSSIs, AONB, WHS, Scheduled Monuments, SACs and SPAs in Cornwall i.e. what is a sensitive area.

The legislation covering Screening Opinions (the EIA Regs 2011) states that:

A request for a Screening Opinion in relation to an application for planning permission should be accompanied by—

(a)  a plan sufficient to identify the land;
(b)  a brief description of the nature and purpose of the development and of its possible effects on the environment; and
(c)  such other information or representations as the person making the request may wish to provide or make.

The information to be submitted to the Council when requesting a Screening Opinion should include a plan to show the location of the proposed hydropower facility, the location of nearest residential properties, details of the layout and key components to the proposed hydropower facility including associated pipework, dams or weirs, and likely sound emissions.

Obtaining a Scoping Opinion from the local planning authority

If an Environmental Impact Assessment is required you are advised to obtain a Scoping Opinion from the Council. This Scoping Opinion will set out the detail and content that the Environmental Statement would need to address when submitting any planning application. The case officer dealing with the Screening Opinion will be able to provide further assistance regarding this matter.

Example of Archimedes Screw.
Image courtesy of Western Renewable Energy

Planning Application Fee

It is important to get things right in terms of the planning application fee for a micro hydro scheme.

The Council recognises that such schemes usually involve the construction of weirs, channels, fish passes and other pipework, as well as a turbine house. The planning application fee will depend on which component to the scheme attracts the higher fee category; either a) the weirs, channels and pipework or b) the turbine house – both can attract a different fee.
To calculate the fee for the weirs, channels, fish passes and pipework calculate the total site area for these aspects to the development. The Council will treat this aspect as ‘plant and machinery’ for the purposes of fee categorisation, whereby £335 per 0.1ha will be charged if the site area (i.e. the area to be edged red) falls under 5 hectares. Where such developments exceed 5 hectares the planning application fee will be levied on the basis of £335 per 0.1ha, up to a ceiling of £16,565 for the first 5 hectares and then £100 for each additional 0.1 hectare.

To calculate the fee for the turbine house calculate the gross floor space to be created by the house. There is a flat rate fee of £170 if the floor space is no more than 40m²; a flat rate of £335 if the floor space is more than 40m² but less than 75m², and where the floor space would be more than 75m² but less than 3,750m² the fee is £335 for each 75m² or part thereof.

Example: Micro hydro facility comprising intake weir, pipelines and channels and a tailrace channel to watercourse (total area 550m²) together with a turbine house measuring 36m².

The fee for 550m² at £335 per 0.1 hectare comes to £335.

There is no need to include the fixed £170 for the turbine house since only the larger fee category is payable.

Planning application ‘red line’ and ‘blue line’.

The planning application site boundary for a micro hydro scheme should be delineated by a ‘red line’. This red line should encompass all development and land that requires planning permission. However all land within the control or ownership of the applicant should be shown and edged with a blue line.
Issues to be considered in any Planning Application

a) Siting, Design & Landscape

Small scale hydroelectric schemes which are carefully sited and designed can have a minimum visual impact on their surrounding landscape but this requires detailed consideration at the conceptual design stages. If the development is proposed in an open landscape any built elements should be minimal or designed to match the character and appearance of the local landscape (see appendix 1 and 2) and any existing architectural features. It may be possible to adopt or renovate existing buildings or structures, particularly if these are former mill features, and such investment may enable older properties to be redeveloped and could provide additional interest. If any of the buildings or structures are listed (see below) such schemes will require particular sensitivity and Listed Building consent will normally be required.

Careful consideration should be given to the design and landscaping of any hydropower scheme. The introduction of a ‘modern’ technology within a rural landscape, or in close association with older properties or structures, will require attention to detail. Hydropower schemes can operate for many years and some built elements, such as weirs and turbine houses, may become features of landscape and architectural interest and this should be reflected in their design and quality. The design of any fencing or security measures should be carefully considered and detailed within any planning application. Any pipelines should normally be ducted or buried and any pipeline routes, disturbed ground or groundworks should be carefully restored. Where older structures or buildings may be affected by the proposed works a bat or owl survey may be required. Application proposals should provide a broad indication of the route of connectivity to the electrical grid. Such connectivity should avoid areas of high landscape, ecological or archaeological sensitivity.

In areas of landscape sensitivity the design and location of a hydropower facility will require very careful thought and consideration. Image courtesy of Tony Baker, Renewable Power Limited.
Checklist Planning Application Information requirements

The local planning authority expects the following details to be included within any planning application;

- Details of all building works proposed, including elevations, cross sections, materials specification, fencing etc
- Details of any pipelines and ground works proposed, including their duration and restoration.
- Details of any changes to water levels, including water storage reservoirs or millponds.
- Details of any trees or vegetation to be removed or pruned and any landscape planting proposed, including details of the planting schedule, species mix, spacing, maintenance and replacement of failures.

b) Historic Environment

Small scale hydropower schemes were once a familiar part of the Cornish landscape. The need for a good head of flowing water usually places such hydropower schemes in a scenic rural setting and traditional water mills have become an iconic part of the countryside. Many water mills have become Listed Buildings and are now located in protected landscapes.

The potential impact of an hydropower scheme on Cornwall’s cultural heritage (listed buildings, Scheduled Monuments, Conservation Areas, World Heritage Site, registered Historic Landscapes and Parks and Gardens of Special Historic Interest) can be defined in two ways:

1. Direct physical impact or loss of identified features of historic interest including undiscovered archaeology;
2. Visual impact on the character or appearance and setting of features of historic interest.

Such schemes may cause direct impacts on archaeological deposits through ground disturbance associated with trenching and foundations etc. Generally sites should be located away from known archaeological sites as recorded on the Cornwall Historic Environment Record – these can be located online using the Heritage Gateway Search facility.
Cornwall’s historic use and application of hydro-power is well attested and reflected in the number of records held in the Cornwall and Scilly Historic Environment Record. There are over 1000 records of archaeological sites and historic buildings associated with the generation of hydro power which represents over 1% of the total record. The principle uses, as would be expected, are agricultural and industrial in nature.

The Historic Environment Record holds records of various types of mills (of which over 470 survive in some form or another in Cornwall) and associated structures such as water wheels, mill ponds, leats, mill races etc.

**Agricultural mills:** Approximately 700 sites are known (which is almost certainly a conservative figure), largely comprising corn mills (627) and cider mills (76), usually operating vertically set water wheels. Surveys from parishes, such as St Keverne show a considerable number may have worked in each parish (eg. 9 operated in St Keverne a century ago) and many probably had their origins in the medieval period and continued in use until the early parts of the twentieth century.

**Tide mills:** There are 21 known sites of tide mills in Cornwall, most of which are only evidenced by fragmentary physical remains or portions of the tidal dam. Most were used for agricultural purposes grinding flour etc. Of the 5 that survive, 3 are listed. A current project at Insworke Mill, Milbrook represents the conversion, of what is probably the last remaining ‘unconverted’ tide mill building and which may be of significant regional importance (South West).

**Industrial mills:** Approximately 170 sites are known in Cornwall. These were employed in industrial activity such as china stone production, gunpowder, tin crushing, sawing, fulling, bone crushing etc. Circular motion was used to either grind stone (eg. china stone, gunpowder) or converted to reciprocating for driving hammers/stamps (fulling, bone, saw). Especially fine examples and complexes can be found at Kennall Vale (gunpowder), the Tregargus Valley (china stone), Kenidjack Valley (tin/copper).

Former watermill sites, such as these at Ponsanooth, are located within important historical, landscape and amenity areas where careful consideration would be required before considering any potential hydropower proposal. Images courtesy of Tony Baker, Renewable Power Limited.
A quick search of designated sites indicates that between 100-150 ‘mills’ survive as Listed Buildings throughout Cornwall. If any of the buildings or structures are listed a proposed hydropower scheme may require Listed Building consent.

Cornwall has an especially important historic environment and there are 12,500 Listed Buildings within Cornwall (details of these buildings may be found at http://www.cornwall.gov.uk/default.aspx?page=2441). There are also 145 Conservation Areas in Cornwall covering 4070 hectares of land. These areas have been designated due to their special architectural or historic interest and the installation of hydropower schemes in, or near, such areas should therefore be considered sensitively. In addition over 5% of Cornwall is designated as a World Heritage Site (WHS). The World Heritage Site is designated for its mining heritage. The World Heritage Site is not necessarily a constraint on renewable energy development; however such development within, or adjacent to, the World Heritage Site must be designed and installed in a manner which does not harm the values of the site. To find out if you are in any of these areas please visit the mapping webpage on the Council website.

✔ Checklist Planning Application Information requirements

The local planning authority expects the following details to be included within any planning application;

- An archaeological assessment may be required for proposed development which may have an impact on any site of known or suspected archaeological interest. Assessment required where proposal may have an impact on the character or setting of a Listed Building, Conservation Area, Scheduled Monument or World Heritage Site.

c) Hydrological and Flood Risk Considerations

The installation of any structure which may alter the flow of water, or affect the passage of fish, will be carefully considered by the Environment Agency and the Local Planning Authority. Image courtesy of Tony Baker, Renewable Power Limited.

The hydrological impact of a hydropower scheme is predominantly a matter to be considered by the Environment Agency. The local planning authority will however wish to consider the landscape and visual impact of any changes to water levels, including storage reservoirs or mill ponds and the impact of these features on immediate and surrounding land uses.
Any alteration to the flow of a river can cause potential flooding issues especially during extreme weather events and therefore a Flood Risk Assessment would be required as part of a planning application. The EA provides a flood risk management checklist in their Good practice guidelines to the environment agency hydropower handbook. This assessment is fundamental to the planning authority being able to support a hydropower scheme.

✓ Checklist Planning Application Information requirements

The local planning authority expects the following details to be included within any planning application;

- Details of the impact of the proposed development on existing and proposed water levels to be shown on a scale drawing showing the lateral extent of such changes, any changes to depth and any seasonal fluctuations.

d) Ecological Considerations

The potential ecological impact of a proposed hydropower development should be carefully considered at the site selection and initial design stages. This should include the impact of potential disturbance within and beside the watercourse during construction and any impacts during operation. Where ecological issues are potentially significant there should be early liaison between the developer, the Environment Agency and English Nature in order to determine the level and extent of ecological information likely to be required at the planning application stage. This may include surveys of the watercourse together with specialist surveys for bryophytes, invertebrates, amphibians, birds and mammals.

Potential ecological impacts should be avoided where possible, by careful site selection, sensitive design and construction techniques and the timing of any construction works to minimise or avoid unnecessary disturbance or intrusion to sensitive species or habitats.

If a hydropower scheme is proposed on, or in close proximity to designated areas of special ecologic interest they may contain some of the most important and sensitive habitats and species, some of which are legally protected. There is a need to ensure any potentially significant or damaging effects on these habitats and species are avoided or minimised. The Cornwall Mapping Service identifies sites of high and protected ecological value such as a Site of Special Scientific Interest, or a Special Area of Conservation, or a Cornwall Nature Conservation (County Wildlife Site). The Council recommends that such areas should, where possible, be avoided for all new development.

The potential enhancement of ecological habitats should be carefully considered as part of any design proposals. A hydropower proposal should, where practicable, provide opportunities to enhance ecological interest and biodiversity. Where engineered features are introduced alongside, or within, watercourses these should be designed and constructed in a manner which encourages and promotes biodiversity.
Good Practice Guidance for Cornwall (2007)

This Good Practice Guidance provides advice on how to take account of bio-diversity and geo-diversity in the development process. It also sets out legal requirements and good practice recommendations—see Cornwall web link.

✓ Checklist Planning Application Information requirements

The local planning authority expects the following details to be included within any planning application;

- Details of any ecological impact of the proposed development, including relevant habitat or species surveys, and any mitigation or enhancement measures proposed.

e) Fisheries Interests

One of the main concerns raised regarding the proposed introduction of a hydropower facility relates to the potential impact on fisheries interests. While this issue is predominantly a matter to be considered by the Environment Agency it is apparent that planning permission is unlikely to be granted, or implemented, should the Environment Agency have significant concerns regarding the potential impact of such a proposal on fisheries interests. It is therefore important that such matters are addressed as early as possible.

Example of a screen to protect fish by preventing their entry into the turbine. Image courtesy of Western Renewable Energy.

Any structures, such as dams or weirs, should be designed and constructed in a manner which allows the safe passage of fish while providing fish, and other freshwater animals, protection from any turbines. The development of a hydropower should, wherever possible, be designed and constructed in a manner which benefits the fish population, for example by oxygenating the water or providing fish passage through a section of watercourse which is currently inaccessible. Early liaison with the Environment Agency, and any fishing interest groups, is highly recommended. Any work should be programmed and scheduled to protect spawning salmonids.
Checklist Planning Application Information requirements

The local planning authority expects the following details to be included within any planning application;

- Details of any measures to protect and enhance fisheries interests.

f) Noise

The turbine associated with a hydropower facility will normally be accommodated within a turbine housing. This turbine housing will generally limit noise levels from the turbine itself such that the turbine should not be audible from more than a few metres away. There is a need however to ensure that noise from water flowing or cascading over other structures, such as weirs and water wheels, does not provide justifiable cause for complaint.

While it may be unrealistic to require a full noise assessment at the application stage the following information should be provided as a minimum to allow the area Environmental Health Officer to assess the potential impact of the proposed development on any nearby sensitive receptors. Should it be considered that the proposed development may have an impact on nearby sensitive receptors this is likely to trigger the requirement for an appropriate noise assessment to be provided by the applicant. Such an assessment would be required to include detailed predictions of likely noise levels at receptors and information on the prevailing background noise level, at typical hydropower operating levels. The level of detail required, will depend on the number of properties that are likely to be affected and the specific details of the proposed development.

Checklist Planning Application Information requirements

The local planning authority expects the following details to be included within any planning application;

- The make and model of the proposed hydropower plant, including the location of any turbines and the design of any turbine housing.
- Most recent manufacturer’s noise data for the make and model of the proposed hydropower turbine(s) to which the planning application relates.
- Six (preferably twelve) figure national grid reference for location of proposed hydropower plant.
- Details of any weirs etc which may cause the cascading of water.
- Plan showing distance (in metres) from the proposed hydropower plant to the curtilage of the nearest non-involved (without financial interest) noise sensitive premises (usually dwellings, but may be schools, hospitals, care or residential homes).
Financial Interest

‘Financial Interest’ is a term used in ETSU-R-97 to enable an increase in the allowable margin of daytime and night time noise levels above background noise where the occupant of a property has a financial interest. While ETSU-R-97 relates to wind turbine development the term is used here with reference to a proposed hydropower development. The term is not however statutorily defined and an assessment of noise will need to be given on a case by case basis.

g) Construction Disturbance

The construction of a hydropower plant will have similar impacts to many other construction projects. The location of such a construction project in close proximity to a watercourse may present particular challenges and concerns, particularly in relation to pollution caused by the spillage of oils, fuels or lubricants or the disturbance and release of silt, mud or suspended solids into any watercourse. The local planning authority may, in conjunction with the Environment Agency, request that an applicant specifies the site management measures that will be adopted in order to minimise and avoid such pollution.

Should it be considered that any construction activities may have an impact on any sensitive habitats the local planning authority may require the preparation, submission and implementation of a detailed construction specification. In some instances, where sites of particular ecological sensitivity and/or particular construction phases are concerned, the local planning authority may require an environmental liaison officer to be present on site in order to ensure that construction works are undertaken in an appropriately sensitive manner.

✓ Checklist Planning Application Information requirements

The local planning authority expects the following details to be included within any planning application;

- Details of construction works to be undertaken, including the seasonal timing of such works, and the measures proposed in order to minimise and avoid disturbance and damage to ecologically sensitive sites.

h) Operational Disturbance

Operational hydropower plants normally require little maintenance, many facilities are remotely managed and will simply require a scheduled programme of routine maintenance. The screen, or ‘trashrack’, which prevents debris from the watercourse entering the turbine housing will requiring cleansing but the frequency of such cleansing will vary depending upon the nature of the watercourse and the particular season.
Checklist Planning Application Information requirements

The local planning authority expects the following details to be included within any planning application:

- Details of any ongoing maintenance and inspection works necessary in order to ensure that the hydropower plant is properly maintained and operates with minimum risk to the environment and the amenity of any nearby residents and/or visitors.

i) Recreation and Public Access

Any proposal for a hydropower facility should carefully consider the impact of such development on the users of any adjacent public right of way, including footpaths and bridleways. Such development should not have a significant detrimental impact on the amenity of people using the footpath or bridleway and the health and safety of such users should be carefully considered, both during the construction, operation and maintenance of the facility. Mitigation measures, such as temporary or permanent route diversion, improvements to the right of way network or the installation of interpretation or visitor facilities should be considered. Plans submitted in support of any planning application should detail any public rights of way which may be affected by the proposed development together with any mitigation or enhancement methods proposed.

Any development should ideally not obstruct a public right of way. If a public right of way is affected the cost of either diverting or stopping up the public right of way can be expensive and could delay the project and there is no certainty that approval would be granted. The Definitive Map and Statement is the legal record of public footpaths, bridleways and byways and can be viewed via the Council’s website.

It is an offence to obstruct a pavement (footway) and the fact that planning permission has been granted, or is not required, does not entitle a developer to obstruct, interfere with or move a Public Right of Way. A development may impact upon a right of way and a diversion or temporary stoppage may be required. Under the provisions of the Wildlife and Countryside Act 1981, a Modification Order may be applied for to re-grade or delete an existing right of way. It is recommended that you contact the relevant Planning Team at the earliest stage if such an action may be required in order for your scheme to proceed.

Checklist Planning Application Information requirements

The local planning authority expects the following details to be included within any planning application:

- Plan showing the location of any public rights of way (PROW) which may be affected by the proposed development, including the delivery, erection and maintenance of the hydropower plant or associated structures, the impact on PROW users and any PROW diversion or mitigation measures proposed.
j) Access and Servicing Requirements

It is not anticipated that the construction of a hydropower plant would normally require a significant number of HGV movements. Proposed hydropower facilities may be located in rural areas where the local highway network would not be able to accommodate the regular passage of HGV traffic, although a relatively small number of HGV’s, associated with a short term construction project may be acceptable subject to an agreed routeing schedule etc.

There may be specific instances during the construction programme which require a relatively large number of HGV movements, such as a significant concrete pour, or the delivery of large pieces of machinery. A traffic management plan may therefore need to be prepared in order to avoid unnecessary local traffic disruption. The traffic management plan should seek to include measures such as:

- Avoidance of HGV deliveries during local peak/school traffic periods
- Temporary traffic management systems for site access
- Reduced speed limits on all identified routes to reduce potential of traffic accidents

The applicant should ensure that the local highway network is able to accommodate the type and number of vehicles likely to be required to install, construct and maintain a hydropower facility. Any planning application should contain details of the highway access to the site (including any access improvements required), on-site tracks and temporary construction compounds. The landscape, visual, ecological and archaeological impact of such development would be assessed as part of any planning application and should therefore be located, designed and constructed with care and sensitivity.

✓ Checklist Planning Application Information requirements

The local planning authority expects the following details to be included within any planning application:

- Details of site access, access route across landholding to hydropower site and vehicle types/numbers required to deliver, install and maintain the hydropower facility. A Traffic Management Plan may be required showing the delivery route of large pieces of plant and machinery on public highway (incl. vehicle swept path tracking where necessary) and hours/days of delivery.

k) Community Involvement and Engagement

Community involvement should be considered as an integral part of the development process. The Regen SW guidance 'south west engagement protocol and guidance for wind energy (October 2004) should be used as a guide where possible. In essence the local community should be engaged, by the developer, at the pre-design, conceptual stage, ideally utilising a local exhibition/presentation where community views can be sought and recorded. A second exhibition/presentation should be arranged, by the developer, some weeks prior to submission of the planning application. This second consultation should allow sufficient time to seek community views/opinions, and take them into consideration, prior to the submission of any final planning application. Any planning application should detail the exhibitions/presentations, any
views/representations received and how any planning application was influenced/amended to accord with such representations. The developer may also wish to undertake an exhibition/presentation following the submission of a planning application.

The use of interpretation and display boards, such as these examples at Delabole Wind Farm and the Wheal Jane Solar Farm, to explain the purpose and function of an hydropower scheme and raise awareness about renewable energy is something that developers are encouraged to consider.

✓ Checklist Planning Application Information Requirements

The local planning authority expects the following details to be included within any planning application:

- Detail the exhibitions/presentations, any views/representations received and how any planning application was influenced/amended to accord with such representations.

I) Decommissioning

Planning permission for a hydro power plant may be subject to planning conditions which require the future decommissioning of the facility in a set period of time (usually 25 years) and, potentially, the return of the ground to its previous appearance. If the hydropower plant fails during the consent period and stops generating electricity for a period of more than 12 months it will be expected to be removed, unless there are genuine mitigating circumstances, and the ground reinstated to avoid the potential visual harm of a derelict structure in the landscape or watercourse. This does not preclude an extension of time application should the hydro power plant still be viably functioning after 25 years.

✓ Checklist Planning Application Information requirements

The local planning authority expects the following details to be included within any planning application;

- Confirmation that the site will be decommissioned once the hydro power facility is no longer operational.
m) Electricity Generating Capacity

Planning applications for a hydropower facility should clearly indicate the installed capacity of the proposed facility. The ‘capacity factor’ and estimated annual production (MWh p.a.) should also be provided together with the number of residential properties electricity equivalent for UK, south west and Cornish properties. A pro forma table, explaining these terms, is attached as Appendix 3. This information will allow members of the public, and elected Members, to clearly understand the generating capacity of the proposed facility.

✓ Checklist Planning Application Information Requirements

The local planning authority expects the following details to be included within any planning application:

- A completed electricity generating capacity pro-forma (Appendix 3)
Appendix A: Landscape Character

The Cornwall and Isles of Scilly Landscape Character Assessment (2007) records the variations in landscape character across Cornwall, identifying 40 Landscape ‘Character Areas’ (CAs). The Character Area information specific to any development site can be accessed through the Cornwall Council web site at www.cornwall.gov.uk/cornwall_landscape. Cornwall is made up of a range of landscapes with a rich diversity of heritage and natural assets – it is important to understand the character of the landscape and how development might affect this character. Once an understanding of the qualities of the existing landscape has been established it is then possible to determine the sensitivity of the landscape to change and whether the landscape has the capacity to accept differing types of development.
Appendix B: AONB Information

The Cornwall Area of Outstanding Natural Beauty is comprised of 12 discrete and separate areas, including Bodmin Moor, the Camel Estuary and sections of the north and south coast. The Tamar Valley Area of Outstanding Natural Beauty covers the Tamar Valley estuary and its inland rivers both in Cornwall and Devon. Over 30% of Cornwall is designated as an Area of Outstanding Natural Beauty. The purpose of the Area of Outstanding Natural Beauty designation is to conserve and enhance the natural beauty of the area. The designation gives formal recognition to an area’s landscape importance and allows for the development of communities and economic activity.

The Cornwall AONB covers 958 sq km and consists of 12 separate geographical areas
Appendix C: Electricity Generating Capacity

Planning applications for hydropower facilities should be accompanied by the following information.

<table>
<thead>
<tr>
<th>Installed capacity (kW)</th>
<th>Capacity factor</th>
<th>Estimated annual production (kWh p.a.)</th>
<th>Number of residential properties electricity equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:

1 Installed capacity is the full-load, continuous rating of the hydropower facility under specific conditions as designated by the manufacturer. In other words, this is the power generated when the turbine is working at full capacity.

2 Capacity factor is the calculated factor which compares the turbines actual production over a given period of time with the amount of power the plant would have produced if it had run at full capacity for the same amount of time. The capacity factor should take account of the specific equipment and the specific location. It is expressed as a percentage.

3 Estimated annual production of electricity based upon the installed capacity and the capacity factor.

4 Number of residential properties that would be powered by the estimated annual production based upon the U.K. average household consumption of 4,629 KWh/year, the South West England average household consumption of 4,993 KWh/year and the Cornwall average household consumption of 5,869 KWh/year (DECC 2007). The number of U.K., SW and Cornwall household equivalent should be provided in this box. Average electricity consumption in Cornwall is currently greater than the U.K. and SW average and so the number of typical residential properties in Cornwall powered by a particular source would be lower.
Appendix D: Screening Procedures Overview.

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Flow chart 1: Screening procedures overview

- LPA receives planning application without EIA
  - OR
  - LPA receives request from developer for a 'screening opinion'. See paragraph ... for further details
  - Developer submits additional information
  - YES
  - LPA adopts a 'screening opinion' (see Flow Chart 2 and Paragraphs ...)
  - Statutory 3 week period, unless otherwise agreed
  - EIA is not required
    - LPS notifies developer of opinion. See Paragraphs ...
    - LPA puts details of opinion on public record
    - Does the developer agree with LPA view?
      - YES
        - Developer notifies LPA in writing that an environmental statement will be produced
        - Developer proceeds to scoping and/or preparing the environmental statement – see following sections
      - NO
        - Developer applies to Secretary of State for a direction and notifies LPA. See Paragraph ...
        - LPA informs statutory consultees about proposal. See Paragraph ...
  - EIA is required
    - LPA notifies developer of opinion, giving reasons

*Delete as necessary*
Planning and Regeneration Service
Flow chart 2: The screening decision

1. Is the development of a description mentioned in Schedule 1 of the Regulations?
   - YES: EIA IS REQUIRED. Formal record of decision to be made – see Paragraph ...
   - NO: EIA IS NOT REQUIRED. File record to be made – see Paragraph ...

2. Is the development of a description mentioned in Schedule 2 (column 1) of the Regulations? See Paragraph ...
   - YES: Is any part of the development to be carried out in a sensitive area? See Paragraph ...
   - NO: EIA IS NOT REQUIRED – except in exceptional circumstances, see Paragraphs ..., file record to be made – see Paragraph ...

3. Is any corresponding applicable threshold or criterion (Schedule 2, Column 2 of the EIA Regulations) exceeded or not?
   - YES: EIA IS REQUIRED. Formal record of decision to be made – see Paragraph ...
   - NO: EIA IS NOT REQUIRED. Formal record of decision to be made – see Paragraph ...

*Delete as necessary*