



DERWENT HYDRO

THE COMPANY

Derwent Hydroelectric Power Limited (DHPL) is a specialist mini-hydro engineering company established in 1988. The company owns and operates 900 kW of its own plant across seven schemes in Derbyshire and, in conjunction with its sister company Derwent Hydro Developments, provides site survey, design, installation and commissioning services to the UK mini-hydro industry.

Since 1988 DHPL has installed, or is in the process of completing, 23 mini-hydro schemes, across England, Scotland and Wales, ranging from 1 kW to 350 kW, including both new-build and refurbishment projects.

DHPL is a registered hydro installer to the government's Low Carbon Buildings Programme (Registration 2122593) and has been a Council member of the British Hydropower Association for 11 years.

Derwent Hydro's list of principal projects is summarised in the table overleaf.

KEY PERSONNEL

Jon Needle is the founder and Director of Derwent Hydro. He has 19 years' experience in the design, construction, installation and operation of small hydro-electric schemes in the UK. He has developed, and now operates, five low-head hydroelectric sites with a combined capacity of 900kW. He has been directly involved in all the projects listed below.

Oliver Paish is a Mechanical engineer with 16 years' professional experience in the planning, research, design, testing and project management of hydropower systems, especially low-head hydropower in the UK and micro-hydro in developing countries. After 13 years at IT Power, he joined Derwent Hydro in 2003 and now specialises in the survey, specification, design and installation of small-scale hydro schemes in the UK.

David Nicholls is a Senior Technician who has worked on the manufacture, maintenance and repair of small water turbines and related equipment since the 1960s. He is a qualified fitter and welder and is also experienced in site survey techniques and the operation of heavy machinery.



PROJECT REFERENCES

PROJECT	Year	Power	Head	SERVICES PROVIDED
DESIGN AND FEASIBILITY				
GreenHolme Mill (ongoing)	2006-7	250kW	4.5m	Detailed design and environmental permissions for a new low-head scheme exploiting the waterways of an old papermill. Client: DHPL
Allport Mill (ongoing)	2006-7	35kW	3.5m	Detailed design and specification for a new low-head scheme based at a historic mill. Client: Haddon Estates
Longbridge Weir (ongoing)	2006-7	300kW	2.7m	Site survey, scheme design and feasibility report for a weir-based low-head scheme. Client: Derby City council
Evesham Mill (ongoing)	2005-6	50kW	2m	Site survey, detailed design and environmental permissions for the conversion of a Victorian powerhouse into a modern hydro-scheme. Client: Private
Glenarm Estate	2006	150kW	40m	Site survey, and detailed design for a medium-head scheme in an environmentally-sensitive valley. Client: Antrim Estates
Coniston Hydro	2005-6	315 kW	80m	Site survey, system specification and intake design for a high head scheme in the Lake District involving 700m of buried penstock. Private client.
Dounans Centre	2005	130kW	135m	Site survey, and detailed scheme design for a high-head scheme in sensitive location. Client: The Scottish Centres
Morpeth Weir	2004	33 kW	2.4m	Site survey, scheme design and feasibility report for a weir-based low-head scheme. Client: Castle Morpeth Council
Cuckney School	2004	7 kW	4m	Site survey, scheme design and feasibility report for a micro-hydro scheme to supply a village school which successfully applied for a £21,000 Clear Skies Grant Client: Notts County Council
Ilam church	2004	8 kW	1.2m	Site survey, scheme design and feasibility report for a weir-based ultra-low-head scheme to provide heating for a church. Client: Ilam Community
Oakhurst Mills	2004	200 kW	4.5m	Site survey, scheme design and feasibility report for the installation of new low-head turbines on an industrial site spanning the River Derwent in Derbyshire. Client: Powergen
Romney Hydro-scheme	2004	200 kW	2m	Design inputs on turbine selection and fish-screen design for an innovative 200 kW project on the River Thames to supply power to Windsor Castle. Client: Npower
Guildford Mill <i>*report available*</i>	2003	40 kW	1.7m	Scheme design and detailed feasibility for the turbine refurbishment and electrification of a 1930s Gilkes water-turbine which successfully applied for a £60,000 Clear Skies Grant. Client: Guildford Council
Blaydon Weir <i>*report available*</i>	2003	45 kW	3m	Site survey, scheme design and feasibility report for a 50kW greenfield development near Gateshead. Client: Gateshead Council
Tangier Mill	2003	100 kW	2m	Site survey, scheme design and feasibility report for the installation of new low-head turbines at a historic pumping station on the River Thames. Client: Npower
INSTALLATION (ongoing)				
Brignall Mill	2006/7	3 kW	3m	Design, manufacture, installation and commissioning of a low-head propeller turbine and control gear. Client: Durham mill-owner
Cuckney School	2006	7 kW	4m	Design, installation and commissioning of an 7 kW crossflow turbine to provide power for a Nottinghamshire school. Client: Notts County Council.



PROJECT	Year	Power	Head	SERVICES PROVIDED
INSTALLATION (completed)				
Itteringham Mill	2006	4 kW	1.4m	Design, manufacture, installation and commissioning of an ultra-low head propeller turbine in a siphon layout. Client: Private
Hamlyn Mill	2006	7 kW	2m	Installation and commissioning of siphonic propeller turbine in a disused sluice channel to supply power to a refurbished mill in Derbyshire. Private client.
Talamh Life Centre	2006	4kW	6.5m	Design, installation and commissioning of a 4 kW Francis turbine to provide power to a converted farmhouse in Scotland. Client: Talamh Life Centre
Cotton Valley Sewage Works	2006	15 kW	2.6m	Design, installation and commissioning of a 15 kW crossflow turbine installed in the final discharge pit at a sewage works, offsetting on-site consumption. Client: Anglian Water
Sonning Mill	2004-5	16 kW	1.5m	Design, manufacture, installation and commissioning of an innovative, siphonic propeller turbine at a historic mill on the River Thames. Client: The Mill at Sonning
Pennant Hydro-scheme	2004	10 kW	80m	Scheme design and installation of Coanda intake, Pelton turbine and control gear for high head domestic scheme. Private client.
Sturston Mill	2003	1.5kW	3.5m	Design and build crossflow turbine, supply generator and control system, install and commission. Private client.
Kilmarnock	2002	23 kW	37m	Specify and supply crossflow turbine, generator and control system for grid connection. Private client.
Oldcotes Mill	2000	3 kW	1.7m	Design and build waterwheel and control system, supply generator, install and commission. Private client.
Biddulph Park	2000	3 kW	30m	Specify, supply, install and commission grid connected pelton. Client: Staffordshire Moorlands District Council
Earthbalance Centre	1999	7 kW	13m	Design, supply, install and grid-connect asynchronous crossflow water turbine set. Client: Earthbalance
Borrowash Mill	1995	100 kW	2.7m	Design, build, install, grid-connect and operate two 50 kW propeller turbine sets. Client: DHPL
REFURBISHMENT				
Marlingford Mill (ongoing)	2005-6	12kW	2.0m	Refurbishment, system design, installation and commissioning of a 1920s turbine, converted to generate electricity for Marlingford Hall. Client: Private
Guildford Mill	2005-6	40kW	2.0m	Refurbishment, system design, installation and commissioning of a 1930s turbine, converted to generate 40kW of electricity in the heart of Guildford. Client: Guildford Council
Marsh Mill	2004-5	6 kW	1.4m	System inspection, diagnosis and refurbishment of a 1920s turbine at Marsh Mill on the River Thames. Private client.
Houghton Mill	2004	6 kW	1.2m	System inspection, diagnostic tests and refurbishment of a low head scheme on a National Trust mill property. Client: N.Trust
Belper Mill	1998	350 kW	3.5m	Upgrade and operate 2 x 175kW grid-connected low head Gilkes water turbine sets. Client: DHPL
Dolanog Hydro	1998	60 kW	4m	Design and supply two 500 mm propeller runners for station upgrade. Private client.
Burton Mill	1997	60 kW	1.2m	Refurbish two very low head turbines and equip with transmission and generators (one synchronous, one asynchronous), grid-connect and operate. Client: DHPL
Masson Mills	1994	260 kW	3.3m	Refurbish, grid-connect and maintain 2 synchronous low head Gilkes water turbine sets. Client: Mara Securities
Milford Mill	1990	180 kW	4m	Refurbish, grid-connect and maintain a 1930s Gilkes low head water turbine. Client: DHPL
ELECTRICAL & CONTROL				
Weir Mill Farm				Commission G83 generator and controls
Wallbridge Mill				Commission G59 protection equipment
Rhodeswood hydro				Commission G59 protection equipment.
Bottoms hydro				Commission G59 protection equipment
Hartington Mill				Supply and commission generator and grid-connect controls.
Fountains Abbey				Specify, supply, install and commission generator and control system for an historic water turbine. Client: National Trust



REFERENCES

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INSURANCES

DHPL's activities are covered by the following insurance policies:

Employer's liability
Public liability
Products liability

Further details can be supplied on request.



Mini-Hydro Project Feasibility

The following table summarises the 4 levels of professional assistance that Derwent Hydro can offer to establish the technical and economic feasibility of mini-hydro sites (from 1kW to 500kW).

Prices are valid for work commissioned before 31st March 2007.

LEVEL OF SERVICE	CONTENT AND OUTPUT	PRICE RANGE
<p>Desk Study</p> <p>To confirm that there is some potential worth investigating further.</p>	<ul style="list-style-type: none"> Brief review of the site based on information supplied by the owner/developer (i.e. grid reference, name of river, estimated fall, site pictures) Verbal or written response on the approximate potential and key issues to resolve to take the site forward 	No charge
<p>Pre-Feasibility Study</p> <p>A low-cost survey to provide a rapid assessment of scheme viability and identify any important constraints.</p>	<ul style="list-style-type: none"> Visit to assess the site, examine any existing works and machinery, measure the hydraulic head, estimate the available flow rate, suggest an appropriate type and size of machine, provide a first indication of energy output and economic payback, and discuss development plans with the owner. Output: 3-4 page pre-feasibility report 	<p>£695 per site, plus travel.</p> <p>(a discounted rate of £495 applies to domestic clients)</p> <p>(Only if the visit plus travel can be completed within one day. Travel is charged at cost, or 50p/mile by road)</p>
<p>Design Report</p> <p>Generally applicable to sites of less than 20kW, this report defines the project, confirms the technical & economic feasibility, and supports licensing & planning applications.</p>	<ul style="list-style-type: none"> Detailed site survey and recording of all key measurements. System sizing and specification. Selection of equipment. CAD drawings of the scheme design. Collection and analysis of flow data and assessment of energy capture. Procurement of quotations for equipment supply. Output: Design report with layout drawings, system specification, energy calculations, equipment costing, economic payback. 	£1500 - £4000
<p>Full Feasibility Report and Licensing</p> <p>A more detailed technical & environmental report required to support larger projects, generally greater than 20kW.</p>	<ul style="list-style-type: none"> Detailed measurements and analysis of data. Detailed scheme design and costing. Full economic and environmental assessments. Discussions with regulators and planners, and completion of all licence applications. Output: Fully documented technical and environmental report, plus licence applications. 	£4000 - £10,000