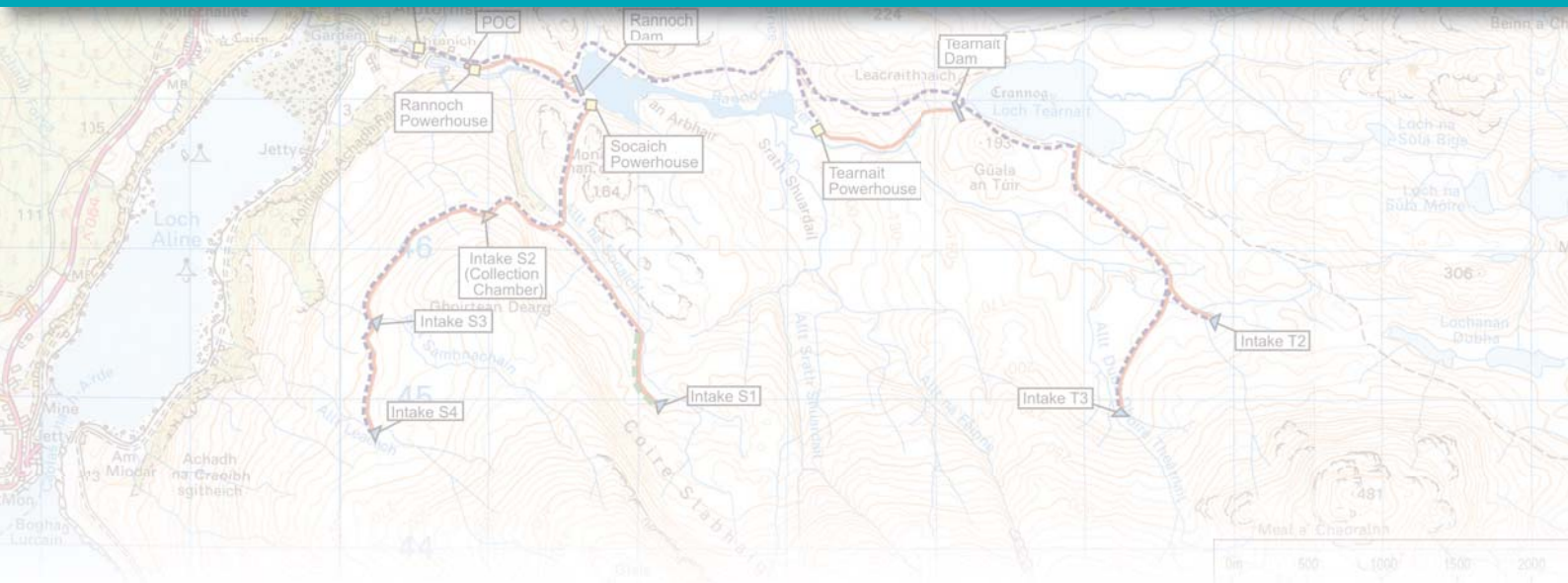


ARDTORNISH HYDROPOWER SCHEMES



Rannoch Dam – Ardtornish

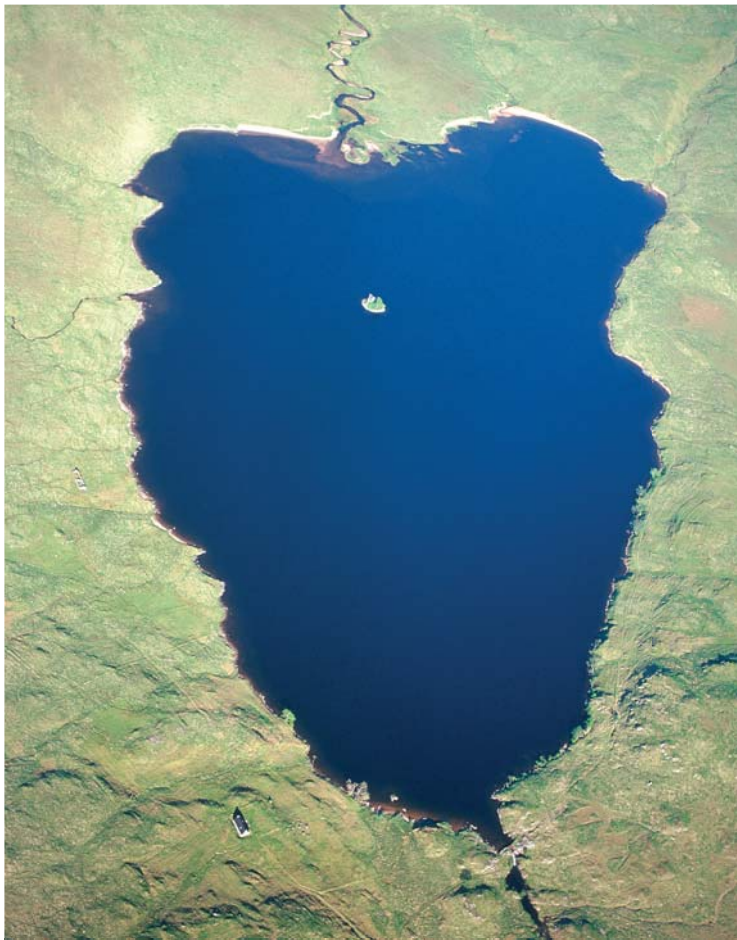


ARDTORNISH ESTATE

3260kW Produced from Multiple Schemes

The Ardtornish Estate is located on the Morvern peninsula on the West Coast of Scotland, covering some 35,000 acres (140km²). The estate has been using hydropower since the mid-1800's, initially for mechanical purposes and later to produce electricity.

Ardtornish Estate



Loch Tearnait



Archimedes Screw - Archanich

Three Schemes – One River

The cascade of 3 schemes on the Rannoch River have a combined capacity of over 2.3MW, starting with Tearnait at 700kW, then Rannoch at 1500kW and finally Archanich at 100kW. Both Tearnait and Rannoch schemes have direct storage via new dam structures, regulating the lochs meaning the lower Archanich scheme benefits from implied storage of the above schemes.

Tearnait – This scheme has three intakes, two divert additional water into Loch Tearnait which acts as a water storage reservoir for the small dam. The loch is fed by the Rannoch River and surrounding burns that flow naturally into the loch. A 1000m pipeline with a 60m head feeds the powerhouse, where a Francis turbine from Gilkes produces 735kW of electricity. This scheme was completed in May 2011.

Rannoch – The next element in the cascade, where Hydroplan designed the 15m high Rannoch Dam, this created a new loch on the estate and provides direct storage for the scheme, giving greater flexibility for power production while allowing over 12 hours of production at maximum capacity.

The scheme has an installed capacity of 1.5MW from the 750m penstock with 69.5m head and uses a Gilkes Francis turbine. This scheme was completed in December 2012.

Archanich – Utilising an old fish farm weir on the Rannoch River, near the estate buildings, this scheme uses the low head available to drive an Archimedes Screw Turbine, producing 100kW. The Archanich AST scheme was commissioned in June 2016.

Run-of-River

Uileann – This run-of-river scheme has three intakes, drawing water from surrounding burns. This 800kW scheme has over 4km of buried pipeline with a head of 122m. This multi-intake scheme was commissioned in November 2015.

Hydroplan was employed by the estate in 2007 to review the hydroelectric potential including the replacement of the 1996 scheme which was performing badly.

Hydroplan carried out extensive feasibility studies on the estate to highlight potential opportunities available, with the outcome showing 5 viable schemes available for development, with 4 in the same catchment and 3 schemes in cascade with direct storage opportunities.

Multifunctional Powerhouse

Socaich – The final element at Ardtornish is this multi-intake scheme with its multifunctional powerhouse that sits on the shore of the loch created by the Rannoch Dam. The scheme has 3 intakes bringing water from 3 burns, as well as hillside run-off via leats that feed into the powerhouse, which contains not only a 275kW Turgo turbine from Gilkes, but a boathouse allowing the estate to make more use of the loch. This scheme has 2.9km of pipe and 101m of head.

Feasibility to Completion

Hydroplan has been working with the Ardtornish Estate for over 10 years, developing the complicated and remote collection of hydropower schemes. As part of the feasibility study, in-house design and management of construction, Hydroplan has addressed important factors enabling minimal environmental impact as well as cost controlling. This is highlighted by the fact that 4 of the schemes were developed using the same grid infrastructure and road network.

From first visiting the estate in 2007 initial planning consent for the Rannoch scheme was granted in May 2009, with construction starting in November 2009, the Tearnait scheme was first to be commissioned in November 2011. Following this, Rannoch was completed and commission in May 2012, Uileann in November 2015, Archanich in June 2016 and Socaich in August 2017.



Uileann - Intake 1



Socaich – Intake 1



Rannoch Dam

Ardtornish Scheme Statistics

Scheme	Tearnait	Rannoch	Uileann	Archanich	Socaich
Installed Capacity	735kW	1350kW	800kW	100kW	275kW
Turbine Type	Francis	Francis	Turgo	Archimedes Screw	Turgo
No. of Intakes	3	1	3	1	3
Total Pipe Length	3.1km	750m	4.3km	60m	2.9km
Head	58.8	69.5	122	7.8	101
Design Flow m ³ /s	1.475	2.8	0.915	3.135	0.377

Scheme Layout at Ardtornish Estate



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