Project Brief for a second smolt bypass in the water system at Catrine Weir

Introduction

The history of Catrine weir goes back to the Industrial Revolution. At that time there were many weirs on the River Ayr, all for the purpose of harnessing the power of falling water to do work, mostly driving small local grain mills and similar applications.

The topography at Catrine provides a drop in riverbed level of 10 metres within a half-mile stretch of the river and this provided the basis for powering a large cotton mill which was built in the 1780s and developed over the next 180 years.

The cotton industry finally withdrew from Catrine in the 1960s, however large sections of the original water abstraction system were left intact. Historic Scotland designated the remaining elements as a Scheduled Ancient Monument of National Importance in 1993. The owners of the site at that time, decided that the designation created regulatory conditions that they had not envisioned when they bought the property from the Mill Owners. The weir and the main sections of the water system were gifted to a local Charity (Catrine Voes Trust) in 1995. The River Ayr is one of the fastest flowing rivers in Scotland and during prolonged heavy rainfall over the catchment area, up to 200 m3 per second can pass over Catrine Weir. This has structural consequences and during the period 1995 to 2005, much deterioration occurred and Catrine Voes Trust (CVT) became dormant.

East Ayrshire Council (EAC), with support from Scottish Government's "Restoring Communities Fund", helped to bring CVT out of hibernation and a refreshed organisation named "Catrine Community Trust" (CCT) was born. A Partnership was created between EAC and CCT, which raised £4m in grant funding to deliver heritage and education projects, one of which was the restoration of Catrine weir and this was delivered in 2013/14.

With the weir now in a stable state, it became viable to restore the 1950s hydroelectric system, which had been mothballed since the 1980s. Prior to the reopening of the hydro scheme in 2016, CCT obtained an abstraction licence from SEPA. The Migratory Fish Acts require that any hydro system that obstructs the course of a river, must make proper provision for native fish to migrate upstream for spawning and downstream to allow the young fish to get back to the Atlantic Ocean.

When river water is abstracted into a lade, fish can enter the water system and these fish must be returned to the river at the earliest opportunity, without harm. CCT's abstraction licence included an undertaking to install permanent smolt screens just downstream of the inlet sluice gates and a smolt bypass designed to guide fish past the screens and back to the river. The original design was agreed by all the riparian interests; however, it has been challenging to make the system work in practice. Incremental improvements were made and by 2019 a successful design was operational.

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Whilst the 2019 bypass at the downstream end of the smolt screens is operational, not all smolts entering the lade chose to use it right away and, juvenile salmon have been observed remaining in the lade, approximately halfway between the sluice gates and the bypass for extended periods of time. There is rising concern that these smolts are at risk of predation by birds and that the proximity of the small fish could also result in the spread of river-borne viruses.

In late 2019, representations were made to CCT by SEPA and River Ayr District Salmon Fisheries Board (RADSFB), requesting additional smolt bypass provision in the Catrine Lade.

Consultation took place in October 2019 and agreement in principle as to what might solve the problem was reached in November. A Consulting Engineer was appointed to develop a bespoke design in December, with the final design emerging in January 2020.

1. **Project Goals**
    a. To alleviate concerns from environmental and riparian stakeholders that the downstream migration of salmon smolts is being delayed at Catrine Weir, with consequential risks to the juvenile fish.
    b. To install new infrastructure required to provide additional downstream smolt migration capacity with minimum impact on the Monument.
    c. To have the new smolt bypass operational as soon as possible and preferably by 1st April, which is traditionally the start of the smolt-run season.

2. **Methodology**
    a. A location has been agreed with SEPA that results in less than 2% of the length of the new infrastructure impinging on the Monument.
    b. It is necessary to cut a rectangular opening (1.5m wide by 700mm deep from normal water level) in the 480mm thick mass concrete lade wall, 20m downstream of the sluice gates to accommodate the installation of the bypass offtake flume.
    c. The lade wall is constructed of mass concrete and it is proposed to utilise diamond tipped rotary tools to make the vertical and horizontal cuts. This will minimise the need to use percussive tools to break concrete.
    d. The smolt bypass offtake structure (1.3m wide by 2.7m long by 1m deep) will be precast in advance of installing a cofferdam in the lade to allow the concrete to be removed from the lade wall safely and to minimise the period during which wildlife within the Voes (a Local Nature Reserve)have to endure lower than normal water levels.
    e. Likewise, the underground pipes that transport the smolts to the river (all out with the monument boundaries) will be in place before installing the new smolt bypass.

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3. **Deliverables;**
    a. A 100% increase in the opportunities for salmon smolts to efficiently migrate downstream from Catrine weir lade; thus, contributing to the efforts of SEPA and riparian interests to slow the decline of Atlantic Salmon.
    b. Minimum interference with the Scheduled Monument.
    c. This is the first phase of a series of projects that will improve the environmental, regulatory and financial sustainability of CCT and its trading subsidiary (Catrine Community Renewables [CCR]), which in turn will enhance the ability of CCT to maintain the water system in good condition for the foreseeable future

4. **Stakeholders;**
    a. Historic Environment Scotland (HES)
    b. Scottish Environmental Protection Agency (SEPA)
    c. River Ayr District Salmon Fisheries Board (RADSFB)
    d. Ayrshire Rivers Trust (ART)
    e. CCT & CCR

5. **Dependencies**
    a. Accelerated grant of provisional Scheduled Monument Consent
    b. Weather conditions have a part to play in working near a spate river.

6. **Material Specifications**

    Concrete for new bypass flume will be C40 mix to BS 8500-2:2015+A2:2019.

    Supplier will be Ve-Tech Concrete Ltd, Tarbolton KA5 5NP 07545 502 799

    £266+ VAT for 2m3 23/1/20

    Shuttering for precast concrete will be provided by the same contractor who built the like for like Fairbairn Sluice Gates (funded by Historic Scotland) in 2000. (Russell Wyllie, Joiners of Mauchline)

    Concrete cutting Services will be provided by CVD of Carluke.