

Change structures or the way they are operated to reduce barriers to flow, sediment transport and fish/eel migration

Project Summary

Title: Pledge's Mill Weir Improvements

Location: Ashford, Kent, England

Technique: Structural modification to fish pass

Cost of technique: ££££

Overall cost of scheme: £££££

Benefits: ££

Dates: 2012-2013

Mitigation Measure(s)

Change the way structures are operated to reduce barriers to flow, sediment transport and fish/eel migration

How it was delivered

Delivered by: Environment Agency

Partners: Ashford Water Group, Ashford Borough Council, Ashford School, Mott Macdonald, Jackson Frameworks.



Background / Issues

Pledge's Mill is located at the confluence of two rivers in Ashford: the Great Stour and East Stour, at the centre of the Ashford Green Corridor and conservation area.

The mill channel on the Great Stour was constructed approximately 500 years ago to provide a head of water to Pledge's Mill. By design, the mill channel gradient was very low and the channel was made over-wide. A fixed crest weir and three sluices impounded the river at the mill, resulting in deeper and more tranquil flow than the natural river channel. The sluices at the mill were operated during high flows to reduce localised flood risk.

The channel gradient had reduced further due to sedimentation upstream of the mill structures; and the mill structures also presented a barrier to fish passage, including eels, coarse fish and brown trout.

The Great Stour upstream of the mill was categorised at "bad ecological status" due to the obstruction to fish passage and a reduction of water quality (due, in part, to poor flow conditions). The removal of the physical barrier along this reach was identified in the South East River Basin Management Plan Programme of Measures and in the Ashford Integrated Water Management Strategy. The river was effectively canalised and provided little aesthetic or social benefit to local residents or visitors to the town. As such, it was disregarded and badly affected by littering.

Design solution:

- Lower the existing weir and upstream channel, rather than remove it completely or bypass the structure. This option was selected to remove the risks associated with altering the unknown foundations of the historic mill structure.
- A new Larnier fish pass and eel brush pass would overcome the obstruction to fish passage.
- Existing bypass sluices that run under the mill should be left open, meaning that the upstream conditions are regulated for a wide range of flows and the fish pass therefore is functional for more of the year.
- A faced gabion and reno mattress solution was chosen to shore-up the existing mill walls to allow the channel to be lowered



Step-by-step

Pre-works

- Ashford School (the landowner) undertook structural repairs to the mill before commencement of the channel works to reduce the risk of walls collapsing.

Works

- The construction works took place on a 70 m-long section of river.
- Clay bunds were set up upstream of the works to divert flow and allow works to be undertaken. This created the dry environment required to install the reno mattresses / gabion baskets, and reduced the risk of dry-area collapse during high flows, leading to a safe working area.
- The new weir was constructed and a high density polyethylene (HDPE) Larnier fish pass and covered eel pass were installed in the channel downstream of the new weir.



(1) Lowering of the existing weir; (2) Installing gabion baskets in dry-working area behind clay-bunds

Benefits

- The improvements at Pledge’s Mill will help fish and eels move upstream to their spawning grounds.
- The river is flowing more naturally and water quality is showing signs of improvement, leading to a wider variety of habitats and wildlife.
- This has helped create a more natural environment for local residents, school children and visitors to enjoy and value.
- The valuable industrial heritage and context of the mill building has been maintained whilst achieving these other objectives.
- Localised flood risk has been reduced and the need to operate sluice gates during flood events has been removed.



Lessons Learnt

- Moving the timing of the works can have significant construction implications, in this case moving the works from summer to autumn / winter lead to a full redesign of the methods used to create a dry-working area due to the increased river flows anticipated during the winter season.

Success

Project contact: Fisheries and Biodiversity Team, South East Region, Environment Agency