10.3 Cost effective silt removal from an impounded channel

RIVER CHESS
LOCATION - Blackwell Hall, Latimer, Buckinghamshire SU 980997
DATE OF CONSTRUCTION - 1994/95
AREA - c3000m²
COST - NOT AVAILABLE

DESCRIPTION
A mill weir on the River Chess was removed and replaced with a fish-pass. This would provide the opportunity for fish passage to be restored and enable enhancement works to the impoverished channel upstream (see 3.9).

The channel above the old mill weir had, over many years, accumulated a vast quantity of silt, mainly from a sewage treatment outfall directly upstream.

Figure 10.3.1
PLAN OF TEMPORARY SILT TRAP LAGOONS
Dredging and re-profiling of the wide silted lagoon behind the weir was carried out in association with the fish-pass works. Prior to the implementation scheme, the water company relocated its effluent outfall downstream of the site.

By lowering the water level, sufficient gradient was returned to the river to re-form a narrow sinuous channel within the previously deep over-widened and ponded section. The impounded channel size needed to be drastically reduced, both in width (8m to 2m) and in depth (in places silt was up to 1.5m deep).

To achieve this the accumulated silt retained by the old weir had to be removed. In order to avoid moving spoil off-site the dredged material was incorporated into an adjacent grass field. Removal off-site of such material is often expensive and, if sent to a landfill site, unsustainable.

DESIGN
Using an excavator a series of low bunds were constructed in the adjacent field. The earthworks followed the fall in land levels to allow gravity flow. These bunds formed three shallow lagoons and a stilling basin. The first lagoon incorporated deflectors to ensure an even distribution across the width of the lagoon. The lagoons were separated by low temporary earth weirs (figs. 10.3.2 and 10.3.3).

The silted river was temporarily dammed and de-watered via the old mill bypass sluice. The river was diverted via a bunded inlet channel through the ‘silt-trap’. To remove the large volume of saturated silt, suction dredging was used, the discharge being pumped into the first lagoon. The silt laden river water proceeded through the 3 lagoons depositing its silt load before ultimately rejoining the existing bypass channel.

Retention time within the silt-trap was approximately 2-4 hours. In this way 1300m³ of excavated and suspended material was removed from the stream.

The area of field used was c. 3000m² resulting in a maximum increase in height over the field of c. 200mm.

The silted lagoons were allowed to de-water for 1 month and the temporary weir materials (tarpaulin and sandbags) removed. The silt and earth bunds were then flattened and graded into the field. The surface was hand raked and the whole area grass seeded with a meadow mix.

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