

10.3 Cost-effective silt removal from an impounded channel

RIVER CHESSE

LOCATION – BLACKWELL HALL, LATIMER, BUCKINGHAMSHIRE SU 980997

DATE OF CONSTRUCTION – 1994/95

AREA – CIRCA 3000M²

COST – NOT AVAILABLE

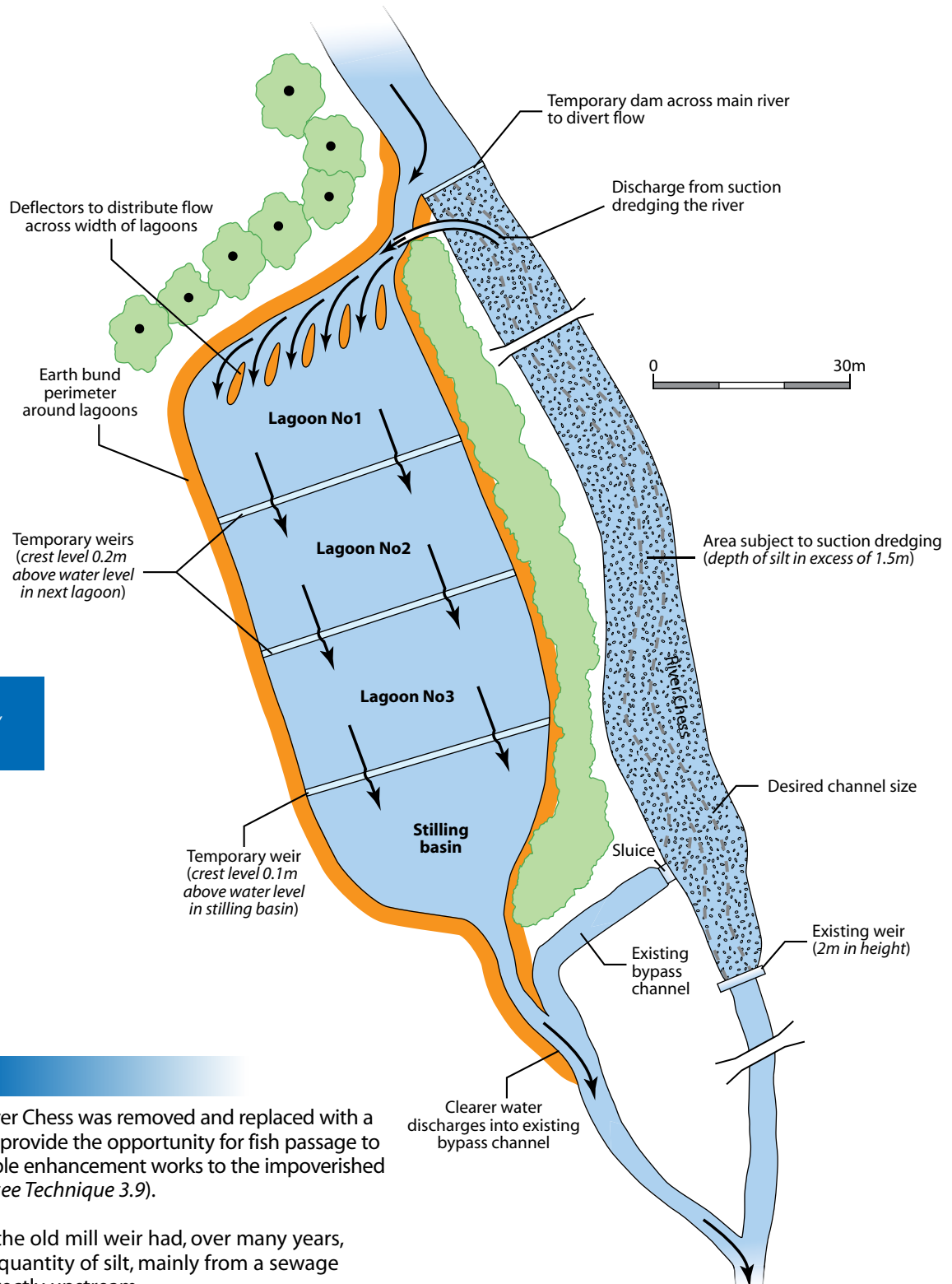


Figure 10.3.1

PLAN OF TEMPORARY
SILT TRAP LAGOONS

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 *Technique 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.

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Mill weir and replacement fish-pass

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.

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 circa 3000m² resulting in a maximum increase in height over the field of circa 0.2m.

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.

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 (Figures 10.3.2 and 10.3.3).



Main Photo (Top right): Exposed silt, looking towards mill weir.
Inset above left: Dredged. Inset above right: 4 years later



Lagoons and stilling basin – February 1995



Lagoons, stilling basin and overspill – March 1995



Retained silt load – April 1995



As a grass field 4 years later

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Figure 10.3.2

TYPICAL SECTION THROUGH LAGOONS

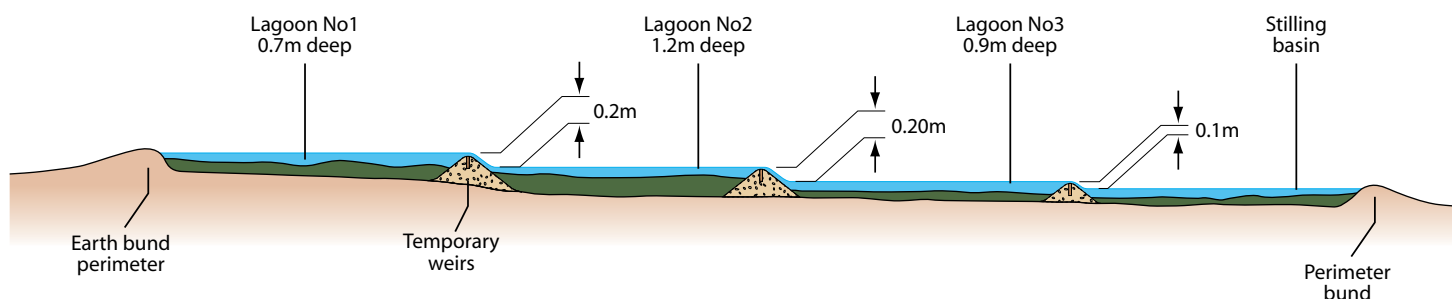


Figure 10.3.3

TYPICAL DETAIL OF TEMPORARY WEIRS



Dewatering. View from inlet channel – April 1995



Graded, harrowed and seeded – June 1995

Subsequent performance 1995 – 2001

Now fully grassed over, the field is not noticeably out of character. Indeed it appears to be a normal field.

Where sufficient gradient exists and loss of floodplain storage capacity is not affected or is not an issue, this technique for de-silting may be a suitable alternative to removal off-site.

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10.3 River Chess 2013 Update

A RRC visit in 2013 confirmed that the site continues to function as a normal field, further demonstrating the benefits of using this technique where this is a necessary requirement. In some areas the vegetation is dominated by nettles (*Urtica spp.*), however this is not uncommon where there is a large amount of silt as nutrient levels are high.

River Chess	Low energy, chalk
WFD Mitigation measure	
Waterbody ID	GB106039029870
Designation	None
Project specific monitoring	None



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The field 18 years after works
– 2013

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