



ENHANCING STRAIGHTENED RIVER CHANNELS

3.9 Introducing gravel to inaccessible reaches

RIVER CHESH

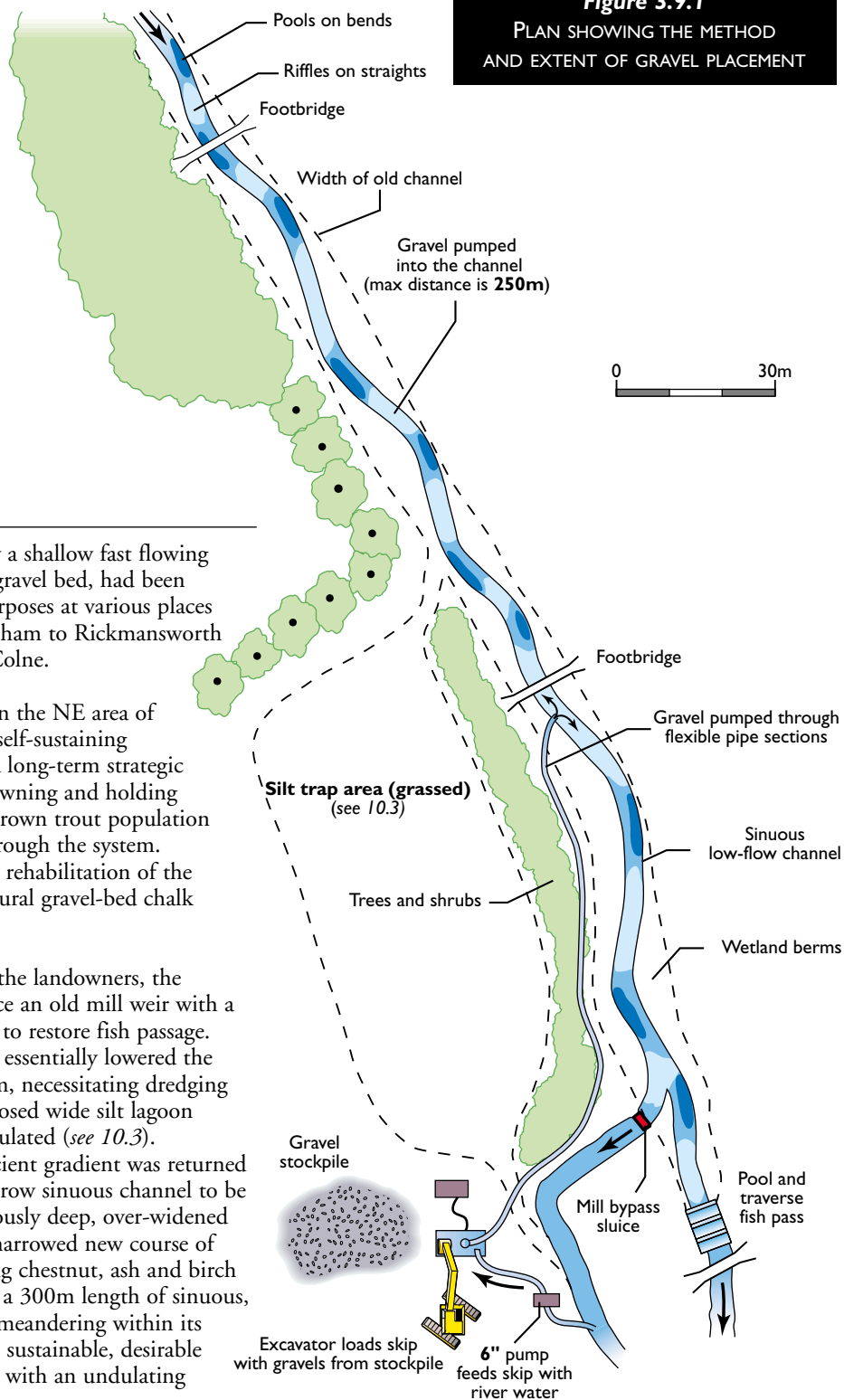
LOCATION - Blackwell Hall, Latimer, Buckinghamshire SU 980997

DATE OF CONSTRUCTION - 1994/95

LENGTH - 250m

COST - NOT AVAILABLE

Figure 3.9.1
PLAN SHOWING THE METHOD
AND EXTENT OF GRAVEL PLACEMENT



DESCRIPTION

The River Chess, naturally a shallow fast flowing chalk stream with a good gravel bed, had been impounded for milling purposes at various places along its length from Chesham to Rickmansworth where it enters the River Colne.

It is one of the few rivers in the NE area of Thames Region to have a self-sustaining brown trout population. A long-term strategic objective is to improve spawning and holding conditions for the native brown trout population and restore free passage through the system. Key to this objective is the rehabilitation of the stream towards a more natural gravel-bed chalk stream habitat.

In 1993, at the request of the landowners, the opportunity arose to replace an old mill weir with a pool and traverse fish-pass to restore fish passage. Building the new fish-pass essentially lowered the upstream water level by 1m, necessitating dredging and re-profiling of the exposed wide silt lagoon where deep silt had accumulated (see 10.3). By lowering the weir sufficient gradient was returned to the river to enable a narrow sinuous channel to be reformed within the previously deep, over-widened and ponded section. The narrowed new course of the Chess was formed using chestnut, ash and birch faggoting. This resulted in a 300m length of sinuous, narrow, fast flowing river, meandering within its oversized old channel. The sustainable, desirable depth was around 300mm with an undulating gravel bed.

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View of the wide dredged section, gravel being placed within the low-flow channel

As a result of the previous management of the river, the Chess had been gradually denuded of its gravel bed. Imported gravels were introduced into the stream by pumping. This method of placement overcame the imposed restrictions associated with conventional plant access to privately owned land and disturbance of woodland and bankside vegetation.

- Using a 6” pump the skip was filled with river water.
- An excavator loaded the stockpiled gravel into the skip.
- The gravel was then pumped along a 250m flexible pipe and fed into the new low-flow channel where specified.

DESIGN

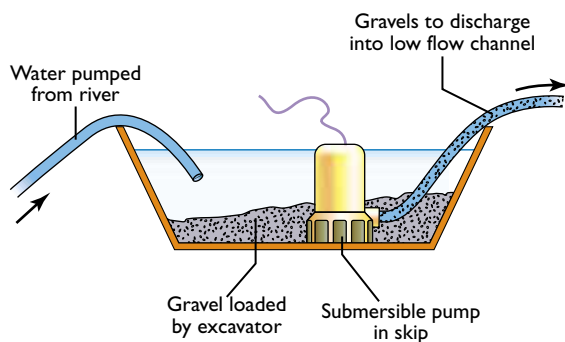
The gravel material specified was well-graded 5-25mm gravel, which closely resembled the grading found downstream. The poor accessibility meant a novel approach was used to place the gravel material.

- At the site compound a submersible pump powered by a diesel generator was placed in a skip located near to the river.



Pumping apparatus in operation

Figure 3.9.2
SECTION THROUGH PUMPING APPARATUS



These techniques are developed to suit site specific criteria and may not apply to other locations





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Gravel pumping in operation

Using this approach the contractor was able to place the gravels economically and without having to remove existing valuable trees and shrubs. By introducing the gravel it was possible to shape the bed, recreating pools on the bends and riffles on the straight sections (*see 5.5 for more detail on bed raising*).

Contacts:

Steven Lavens. WS Atkins, Woodcote Grove, Ashley Road, Epsom, Surrey. KT18 5BW. Tel: 01372 726140.

Chris Catling. Environment Agency – Thames Region, North East Area Office, 2 Bishops Square Business Park, St Albans Road West, Hatfield, Herts, AL10 9EX, Tel: 01707 632370.

SUBSEQUENT PERFORMANCE 1995 – 2001

Some redistribution of gravel has occurred locally, forming deeper hollows and bars.



Four years on – gravel shoals and deeper hollows remain