3

# ENHANCING STRAIGHTENED RIVER CHANNELS

## 3.7 Replacing a concrete drain with a 'natural' channel

### YARDLEY BROOK

LOCATION - Shard End, South-east Birmingham SP 118198
DATE OF CONSTRUCTION - March 1995
LENGTH – 100m
COST - £5,000

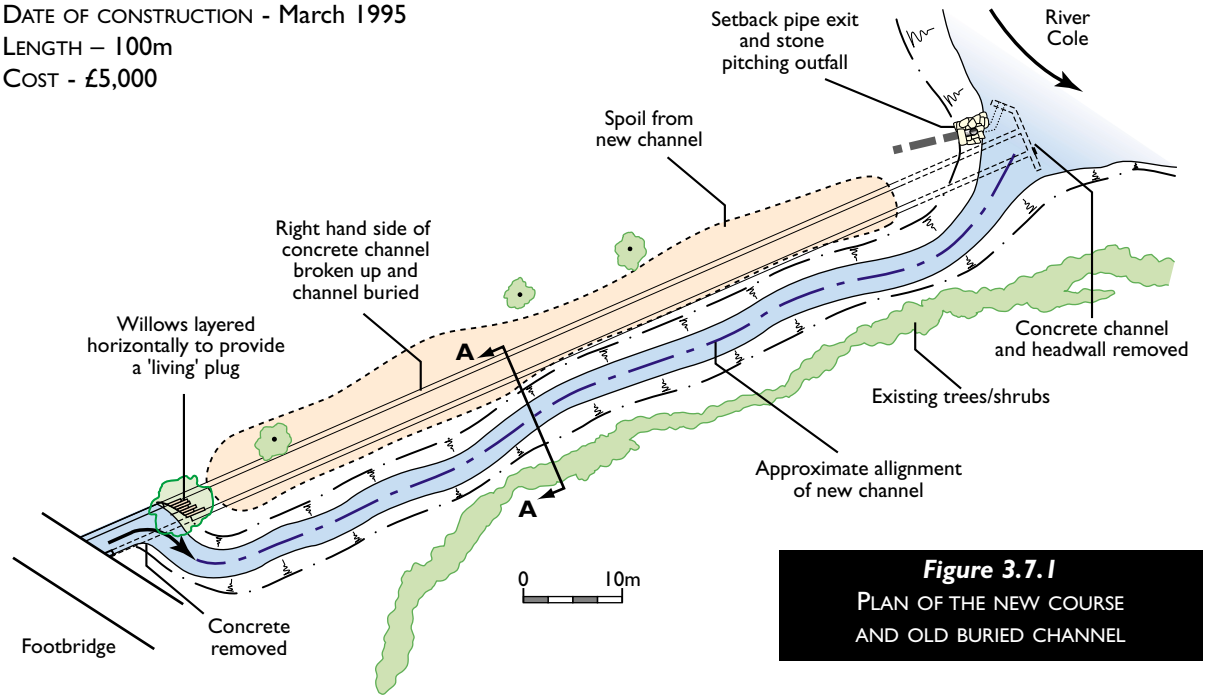


***Figure 3.7.1***
PLAN OF THE NEW COURSE AND OLD BURIED CHANNEL

### DESCRIPTION

Yardley Brook rises in south-east Birmingham and emerges from a culvert onto the floodplain of the River Cole in a concrete channel. The catchment is highly urbanised, with over 150,000 people living within 2km of the river. Urban run-off thus causes periodic poor water quality and significant litter. The brook itself is contained within an area of made-up ground which has been retained as public open space.

Originally a sewage outfall, the brook no longer needed to be contained in a concrete straight-jacket due to closure of the sewage works upstream c.30 years ago. The brook is located within the Project Kingfisher area; a collaboration between local and statutory authorities and volunteer groups to achieve a substantial improvement in the wildlife quality of an 11km section of the Cole and adjacent land in Solihull and Birmingham.

Yardley Brook – entering the River Cole. Before works

The brook was constrained in a concrete sleeve, offering no possibility for small-scale in-channel enhancement. Rehabilitation required removal of the brook from its 100m long concrete surround. Complete relocation, rather than removing the concrete, was the cheaper option.

## DESIGN

The lip of the concrete channel was broken up using an excavator, to ensure that once buried the remnant channel would not protrude above ground level. The broken concrete was pushed into the barely flowing channel.

Figure 3.7.1 shows the 100m sinuous channel that was excavated alongside the brook. The new course was excavated at a greater depth than the concrete channel bed. Previously the bed of the River Cole had been approx. 700mm below the concrete outfall, as a result of deepening of the Cole over the lifetime of the concrete brook. A simple 'V' shaped channel was dug with sloping earth banks as it was decided that the brook could sufficiently shape itself. Over-specifying the design would not be cost-effective.

All spoil was stock-piled between the new and the old channel, and where this became too narrow, on

Concrete channel being broken up

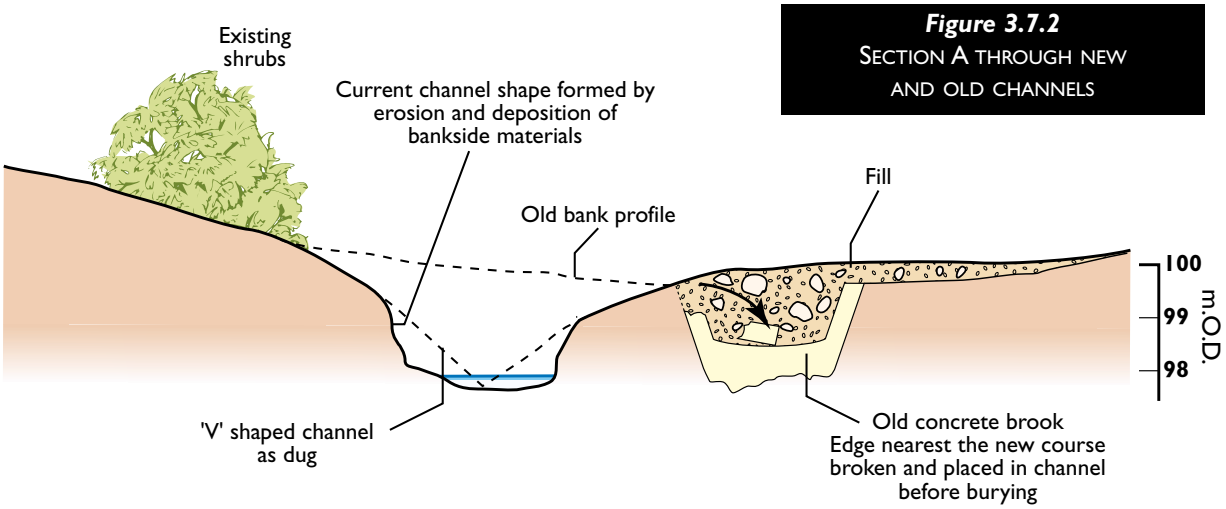


***Figure 3.7.2***
SECTION A THROUGH NEW AND OLD CHANNELS

The 'new' Brook being excavated adjacent to the old channel. Spoil stockpiled

the opposite bank of the old channel. This maintained the flow through the old drain and allowed all work to be carried out in the dry. Once completed flow was diverted through the new course, and the old channel was filled using the spoil from the new.

At the upstream end of the 'new' brook the old course was blocked with rubble then plugged with live willows laid in during the in-filling process to form a growing plug.

The new confluence with the River Cole is on the site of the old outfall structure. The large ( 9m by 2m) concrete eyesore was removed and the mouth reformed to a more natural appearance. A number of large concrete blocks, remnants of failed bank protection works, were also removed. This concrete was broken up and buried nearby.

A drainage pipe that exited at the old outfall structure was given a new stone pitched headwall which is now well hidden by growth and difficult to discern.

The works took two weeks, one of which accounted for concrete removal and breaking-up. The end result is an apparently natural 2-3m wide channel.

Live willow plug

After:
The new 'natural' Brook

## SUBSEQUENT PERFORMANCE 1995 – 2001

Immediately following the diversion to the new channel a dramatic change in the habitat quality of the brook was achieved in terms of landscape, visual amenity and ecology.

After completion winter flows quickly began to 'develop' the kinds of natural channel features one would associate with a small brook. The 'V' shape quickly transformed through erosion of the loose fill material into a much more 'natural' channel 2-3m wide. This process has continued as the site matures.

The live willow plug has grown to secure the breakout point of the new brook. This area now blends in well with the general appearance of the brook and its self-set bankside trees and shrubs.

Six years on, Yardley Brook has developed 'natural' channel features in contrast to the concrete channel previously in place. The brook still suffers from periodic poor water quality due to the dense urban population that surrounds it.

The work was deemed so successful that a further concrete length of the main River Cole was removed in 1996-1997. This type of 'demonstration' site gives added confidence to others and reduces potential risks through valuable experience.

Six years on:
Earth cliffs, gravel shoals and a diverse flow regime. April 2001

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