



Working to restore & enhance our rivers

# CONTROLLING RIVER BED LEVELS, WATER LEVELS AND FLOWS

## 5.1 Bifurcation weir and sidespill

### RIVER COLE

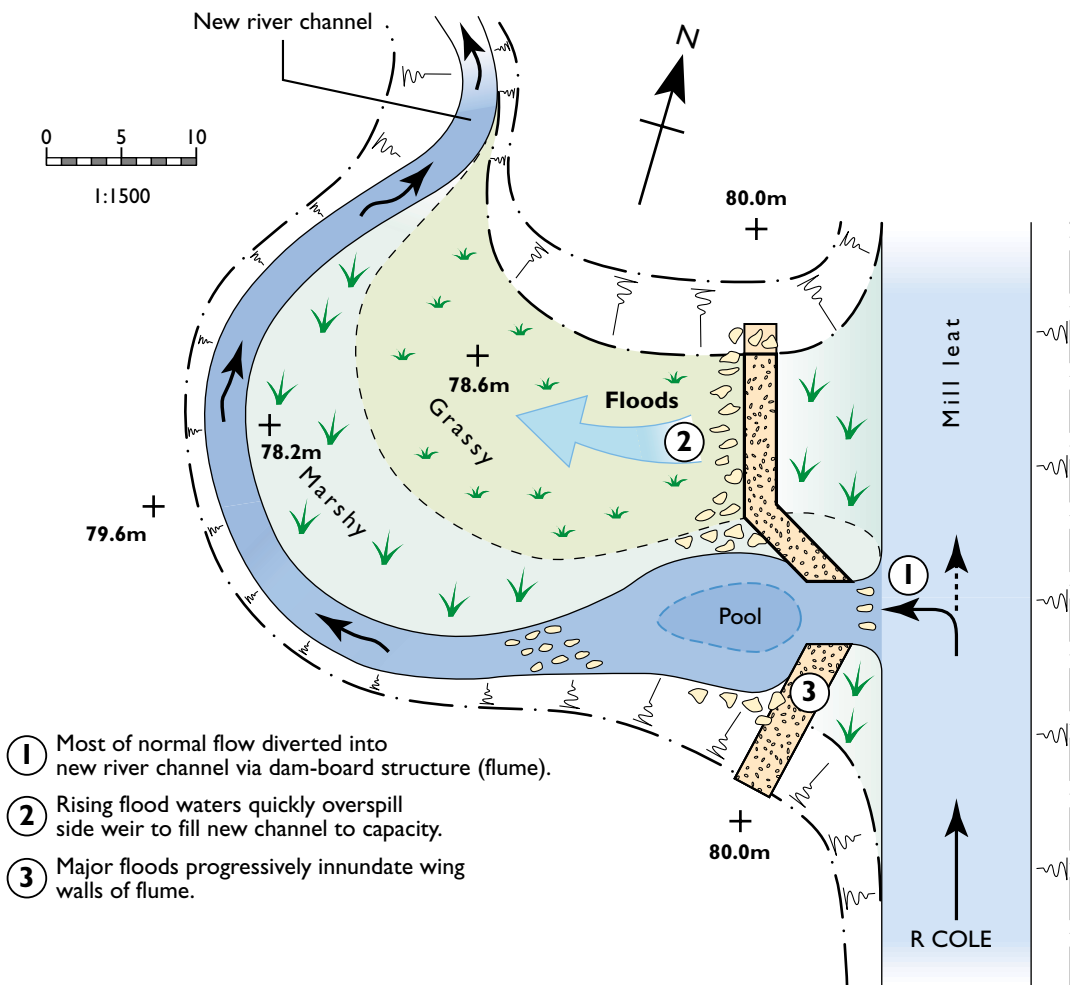
LOCATION – Coleshill, Oxon/Wilts border, SU 234935

DATE OF CONSTRUCTION – Autumn 1995

LENGTH – 30m

COST – £10.5k

**Figure 5.1.1**  
PLAN OF BIFURCATION WEIR



- ① Most of normal flow diverted into new river channel via dam-board structure (flume).
- ② Rising flood waters quickly overflow side weir to fill new channel to capacity.
- ③ Major floods progressively inundate wing walls of flume.

### DESCRIPTION

Most of the flow in the river needed to be diverted from the mill leat, where it is impounded at a high level, into a newly created, free flowing channel that branches from it (see 1.1). A structure was needed to meet the following criteria:

- control the level and volume of water retained in the leat;
- control the volume of water diverted to the new channel;
- maintain stable structural conditions when inundated by floods;
- create a visually attractive feature with ecological value;

- safeguard flow to the new channel should the mill sluices be suddenly opened.

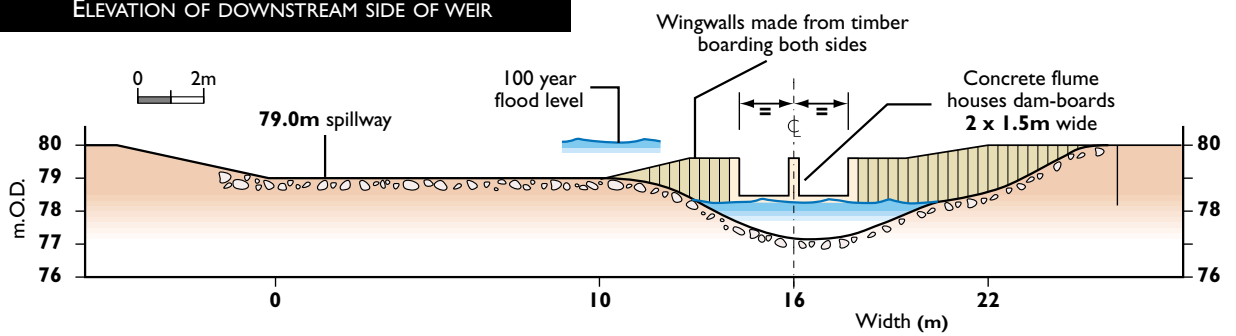
A further hydraulic requirement was that the new channel should have filled with floodwater via the new structure just before the mill leat itself overflowed at a point some 250m further downstream. A designed 'high level' overspill exists here (at 79.2m) to initiate general inundation of the floodplain. If the new channel was only partially full at such time, then floodwaters would drop into it causing serious scour of the banks, risking breaching between the new channel and the leat.

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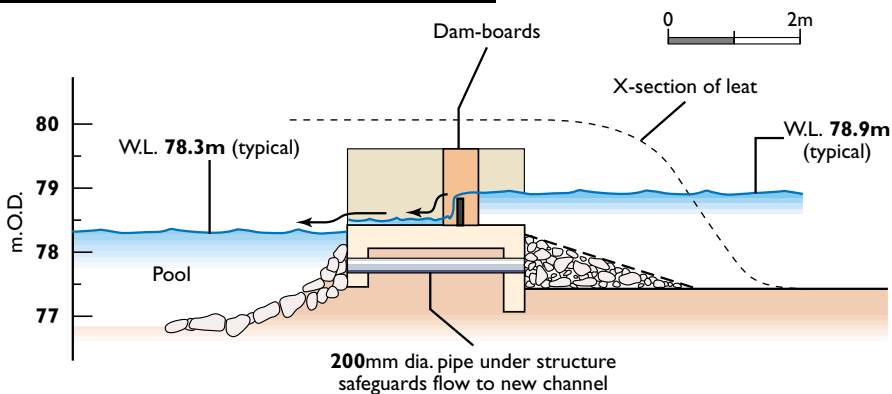


Control weir (location ① on plan)

**Figure 5.1.2**  
ELEVATION OF DOWNSTREAM SIDE OF WEIR



**Figure 5.1.3**  
SECTION THROUGH DAM-BOARD STRUCTURE





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The hydraulic capacity of the flume is small (to suit base flows) so a 10m wide spillway is incorporated alongside to feed sufficient floodwater to fill the new channel. The crest level is only 0.1m above the normal water level in the leat so it operates frequently. Below the spillway, a large area of land is gently graded out towards the new channel which sustains marshy conditions around its inner margins. This low lying area is largely flooded before overspill occurs, ensuring a fairly smooth combining of floodwaters passing downstream. Water in the new channel rises quickly, ensuring the overspill is completely submerged (drowned) at an early stage of a rising flood, thereby further reducing scour potential.

The spillway is defined by two parallel lines of road kerbs infilled with stone/gravel (a small amount of rock is incorporated along the downstream edge of the kerb line where eroding eddy currents are strongest). Reeds growing upstream of the structure also help to ensure stability and improve 'natural' blending between hard and soft elements.

Wingwalls link the flume to the spillway, and to the adjacent banks of the leat, through a smooth transition of levels. Large floods will inundate these walls

so they are designed as weirs in their own right. Two parallel lines of vertical wooden planking are joined via walings and tie rods, infilled with clay, and topped with stone/gravel. The wingwalls are thereby free-standing structures that simply abut the sidewalls of the flume.

The spillway and wingwalls form a 'natural' footpath and are linked over the flume by a temporary wooden bridge.

### SUBSEQUENT PERFORMANCE 1995/8

The structure has functioned exceptionally well and fulfils all design criteria. The complex configuration of channel and landforms combine with diverse patterns of flow currents to sustain a variety of habitat niches as well as an overall feature of landscape interest. Snipe are commonly seen probing the marshy areas intrinsic to the design. The National Trust (owners) plan to undertake landscape planting, and to provide a permanent bridge to further enhance the location. The abundance of fish in the new channel suggest that migration is occurring satisfactorily.



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Spillway alongside bifurcation weir  
– April 1997



Flood filled channel  
downstream of  
bifurcation weir

