



# Enhancing Straightened River Channels

## 3.2 Narrowing with aquatic ledges

### A) RIVER SKERNE

LOCATION - DARLINGTON, Co DURHAM, NZ301160

DATE OF CONSTRUCTION - TYPE A – AUTUMN 1997, TYPE B – AUTUMN 1998

COST – TYPE A – £45 METRE, TYPE B – £40 METRE



Attaching coir matting to create Type A ledges on River Skerne

### Description

The river had been straightened and enlarged to carry floodwater safely through an urban area. A gas main runs parallel to one bank and contaminated landfill lies close to the other. The channel was uniformly trapezoidal although bank toes had been eroded. No diversity in the shape of the bed or banks, or of current flows, existed and the ecological and visual amenity was poor.

Ledges were installed both upstream and downstream of Hutton Avenue footbridge; in the former location along an unmodified channel and at the latter in association with current deflectors. These ledges help control undercutting of the river bank toe as well as introducing desirable habitat and improved visual amenity. They also narrow the normal flow channel encouraging velocity variations in an otherwise sluggish river.

### Design

As marginal plants were absent in the reach it was evident that the straight river would not naturally sustain the shallow, silty edges necessary for their growth. The design needed to create these conditions artificially in a manner that would eventually become self sustaining.

Two designs were developed utilising proprietary matting to hold backfilled river silts in place along the waterside (*Figure 3.2.1*). The ledges created were either planted with pre-grown materials or left to colonise from planting introduced nearby.

Type A design is suited to wide ledges (up to 2m at this site) but the width can be varied to introduce curvature to the plan alignment.

Type B design is suited to narrow ledges and is most appropriate where the river bed falls away steeply at waters edge and a small fringe of marginal vegetation is all that can reasonably be sustained.

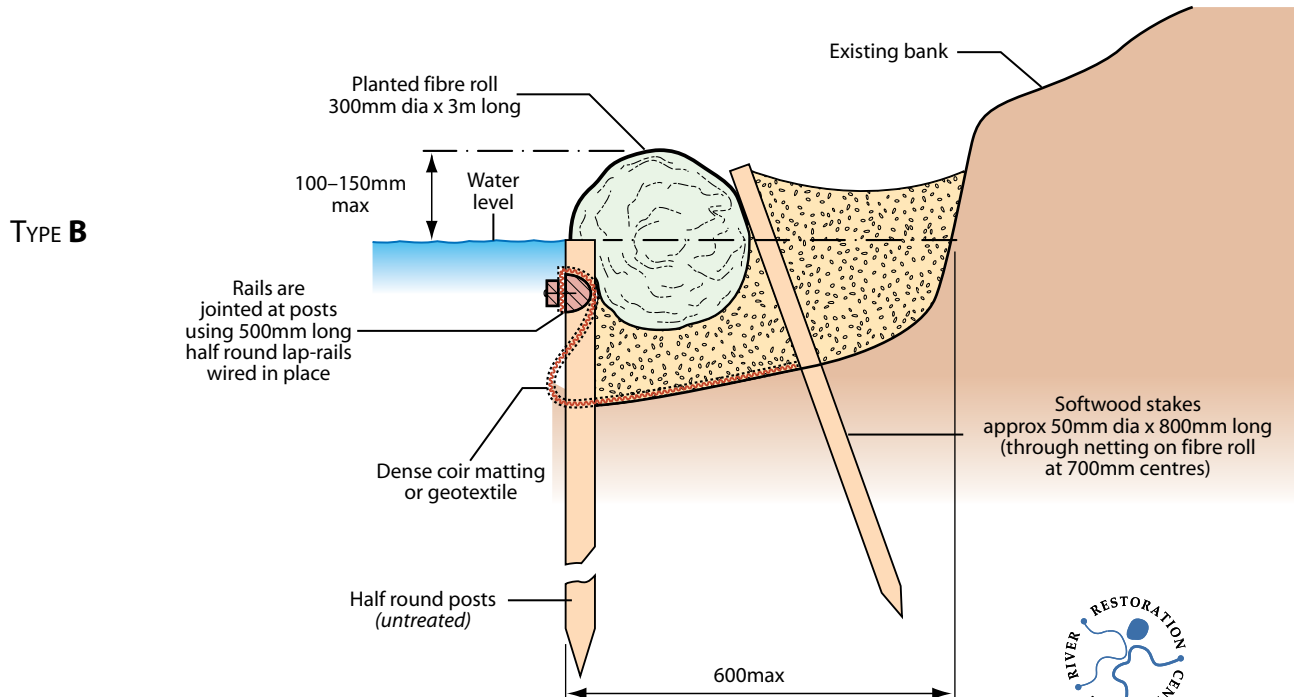
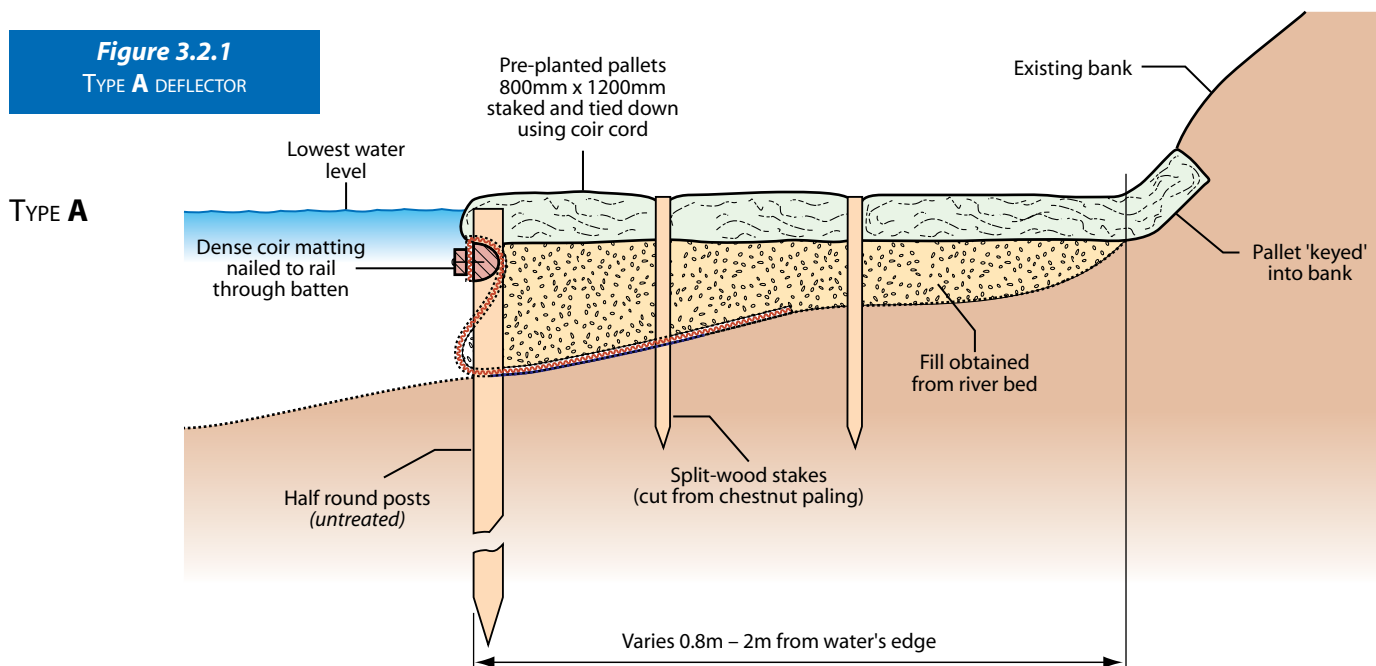
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Both designs rely upon a face of untreated timber posts and rails to hold the matting containing silt backfill. To ease construction, these are firstly assembled with matting in place just above water level and then the posts are pushed below water using an excavator bucket. The use of wire ties at rail joints affords the necessary flexibility.

Biodegradable coir matting was favoured, but some nylon matting (Enkamat) was utilised in the type **B** application where hydraulic conditions suggested a long life material was needed. Under most conditions the root growth of the plants introduced is expected to consolidate the underlying silts whilst matting and timber slowly decay, perhaps over a 5-10 year period. Emergent growth was expected to attract silt deposits as plants become established.

**Figure 3.2.1**  
TYPE A DEFLECTOR





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Type A Ledge on the Skerne – May 1998

### Subsequent performance 1995 – 2001

Type B margins utilising plant rolls were installed upstream of the footbridge in August 1996. In 1998 they are attractive features much favoured by resident ducks that have created some bare patches between well established runs of lesser pond-sedge, yellow flag and reed canary-grass. The attraction of silt within the overwinter dormant vegetation along the ledges is significant; ledges have built up by as much as 300mm in places before being assimilated within new spring growth.

Type A margins using plant pallets were installed downstream of the footbridge in the autumn of 1997 and overwintered satisfactorily in dormant conditions after several floods. Early summer 1998 growth was patchy with some silt banks smothering pallets. Growth was sufficient to ensure the spread of species to generate the dense cover required. Notable species that survived include occasional purple loosestrife and meadowsweet.



Type B Ledge on the Skerne after 2 years



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### B) RIVER COLE

LOCATION - COLESHILL, OXON/WILTS BORDER, SU 234935

DATE OF CONSTRUCTION - AUTUMN 1997

COST - £56/METRE

### Description

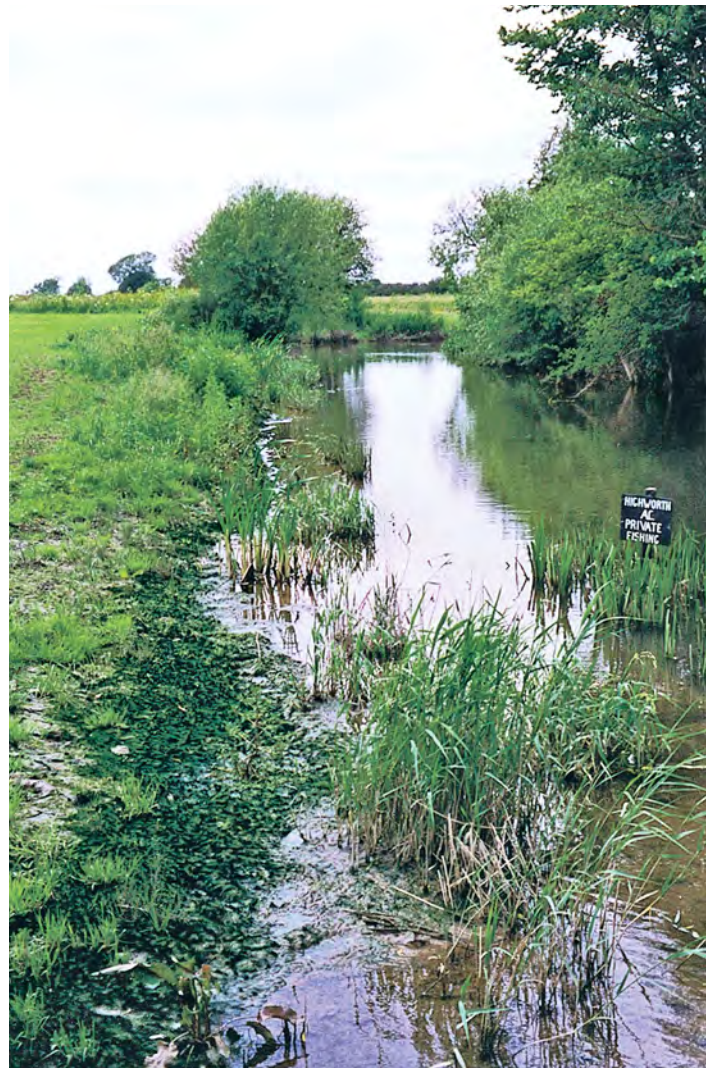
Ledges of both type **A** and type **B** designs used on the Skerne were created on a short reach of the river located immediately downstream of the main road bridge at Coleshill. The work followed the installation of a new gas pipe crossing under the river bed and were part of the contractors river bank reinstatement programme.

The river conditions are more fully described in *Technique 1.2*. The reach is part of the original river within which water is impounded by newly created meanders downstream.

Post and rail was driven up to 2m out of from the waters edge, coir matting attached and then backfilled with soil excavated from the same river bank. Excavation from the river bank enabled the width of the ledge to be extended, to more than 2m in places but, more importantly, it afforded a flatter, more varied bank profile than the previous 1:1 batter. Transitions into the existing banks at each end used the type **B** design.

### Subsequent performance 1995 – 2001

The ledges overwintered well in dormant conditions with no structural damage by floods although little more than 50% of the plants appeared to have survived to grow on during summer. The ledges are developing very well (1998) and creating both emergent vegetation habitat and landscape enhancement in the short stretch of river that previously had the least habitat and visual amenity value.



Type **A** and **B** ledges on the Cole after one winter



Prior to re-profiling and ledge construction – May 1996

