



Enhancing Straightened River Channels

3.10 Sinuous low-flow course in an over-wide urban channel

RIVER SOMER

LOCATION - MIDSOMER NORTON, SOMERSET ST66495420

DATE OF CONSTRUCTION - MAY 2011

LENGTH - 167m

COST - £40,000



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Measuring existing channel dimensions prior to works - 2011

River Somer	Low energy, clay
WFD Mitigation measure	
Waterbody ID	GB109053022250
Designation	None
Project specific monitoring	Habitat survey, fish, invertebrates

Several on-site factors limited the extent of the works. The channel is culverted at either end of the High Street. Vertical stone walls line the reach, with various surface water drainage pipes discharging into the channel. Two small footbridges cross the channel, along with three low weirs. The bed comprised mostly natural bedrock with some concrete screed to provide a level surface at the time of construction of the bridge piers and weirs.

The pre-restoration reach had a mean water depth of 0.5m and a mean channel width of 4.5m.

Description

The overall aim of this project was to improve an over-wide and heavily silted reach of the River Somer running through Midsomer Norton High Street. This involved removal of three small weirs and constructing a new sinuous channel that had sufficient morphological dynamics to remove the need for regular de-silting, reducing maintenance costs and disturbance.

Project objectives included: constructing a sinuous channel using local materials (including accumulated silt); providing diverse habitat features for fish (especially wild brown trout (*Salmo trutta*), plants and invertebrates native to the River Somer; improving the aesthetics of the reach within the town centre; increasing the opportunity for local people to encounter a range of river wildlife; and involving the local community in construction and long term maintenance.

The existing Midsomer Norton Flood Alleviation Scheme and flood relief channel was exacerbating the build-up of sediment by diverting higher "flushing" flows around the town centre reach. However, this also presented an opportunity to create a design which was not heavily constrained by flood risk concerns, since the High Street typically only received local surface floodwaters.

Design

The new sinuous channel design was constructed by forming berms to create a low flow channel, with higher flows able to over-top these features. This enabled the required capacity to be provided. The flood relief channel maintained the current level of flood defence to the High Street and allowed flows to be temporarily diverted away from the reach during construction.

The low flow channel width and spacing of the pool riffle sequence was informed by a suitable reference reach from the Somer catchment.

Accumulations of silt were removed from the channel and retained on site for use as backfill in the new design. Three weirs were removed, retaining only the two sides of each structure which were incorporated into the channel berms. This was at the request of the council who wanted to be able to install temporary boards across the channel to retain water depth, should severe drought conditions occur.

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The berms were constructed from “white lias” limestone blocks from a nearby quarry. These were hand placed to mark the edge of the new low flow channel, allowing gaps for existing drainage pipes. The blocks varied in size to a maximum of approximately 0.40m x 0.3m x 0.15m. Planting bays along the edges of the new channel were lined with a heavy coir blanket and filled with the retained silt.

A carefully selected range of native riparian plants, such as brooklime (*Veronica beccabunga*), water forget-me-not (*Myosotis scorpioides*) and water mint (*Mentha aquatica*) were procured from a professional supplier as plugs. This was primarily informed by a survey undertaken within a reference reach. Consideration was given to plants whose flowers would be attractive in the urban setting and species which would encroach into the channel to adjust the width, but flatten during flood flows to ensure they would not reduce conveyance capacity. Plants which would increase the physical integrity of the berms were also chosen.

A 40mm–60mm angular gravel mix from a local supplier was used to dress the top of the berms and create the riffles.

Figure 3.10.1

PLAN VIEW OF NEW CHANNEL DESIGN

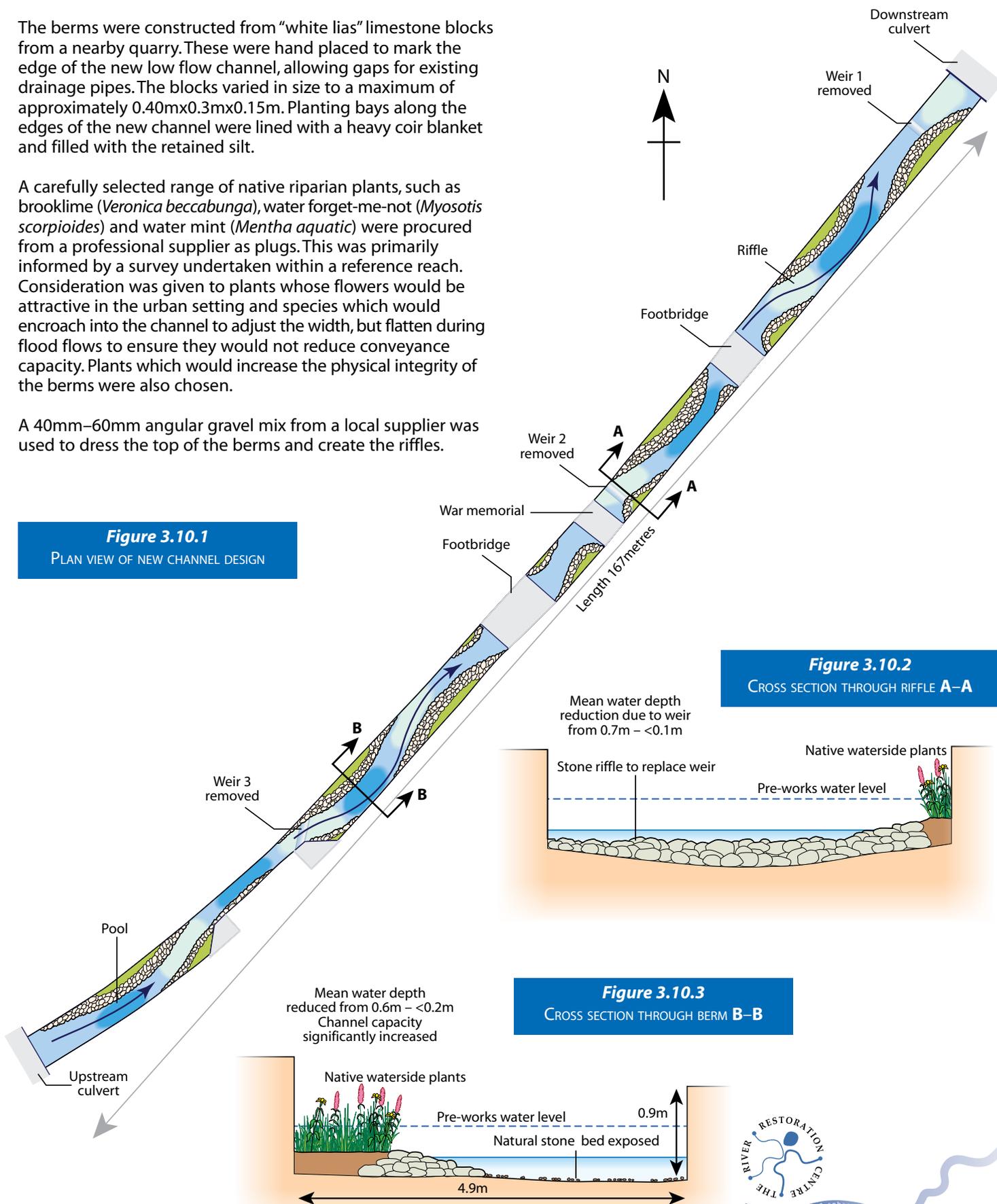


Figure 3.10.2

CROSS SECTION THROUGH RIFFLE A-A

Mean water depth reduction due to weir from 0.7m – <0.1m

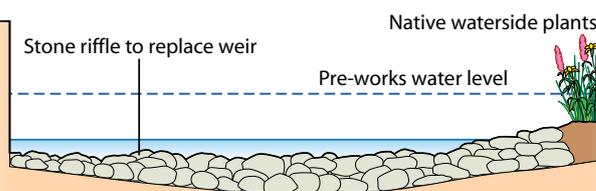
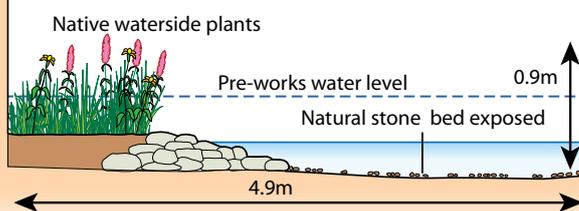


Figure 3.10.3

CROSS SECTION THROUGH BERM B-B

Mean water depth reduced from 0.6m – <0.2m
Channel capacity significantly increased





Limestone blocks laid out to delineate berm structure edges – 2011



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Silt is used to fill the marginal berms ready for planting – 2011



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Two sides of the weir have been retained and incorporated into the berms – 2011



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Local volunteers help to complete the planting phase – 2011

Subsequent performance

In June 2012 the first formal post project assessment and maintenance visit was carried out. This was to assess the condition of the channel against the original project design and aspirations in terms of ecology, aesthetics, resistance to flood flows, flow patterns, siltation and routine maintenance by volunteers.

This assessment indicated that the berms were intact and in good condition despite several high flow events. Plant communities had matured well, providing a diverse marginal habitat.

Kick samples revealed that aquatic organism diversity has

increased since completion of the scheme. Whilst kick samples were being taken three-spined stickle-back (*Gasterosteus aculeatus*) and bullhead (*Cottus gobio*) were captured. Many more stickleback were also observed in the slower channel sections. Freshwater shrimp (*Gammarus pulex*) were extremely abundant in the kick samples, indicating an improvement in aquatic conditions due to its pollution intolerance and requirement for high levels of dissolved oxygen. Some small silt deposits have formed in low flow areas, but the channel is generally self-cleansing. The project has been awarded a civic "Pride of Place" award for environmental enhancement from Midsomer Norton Town Council.

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Maintenance, carried out by volunteers from the Friends of the River Somer group, has helped to keep the channel free of litter and nuisance species such as buddleia (*Buddleja davidii*), dock (*Rumex hydrolapathum*) and nettles (*Urtica dioica*).

Time spent discussing and explaining the principles and objectives of the scheme with stakeholders such as contractors, labourers and locals was well-spent. In this case it has facilitated the formation of the Midsomer Norton River Management Team who will help to ensure the continued success of the scheme.

The involvement of the local community from the outset has provided an opportunity to build a long term maintenance strategy, and has been an important legacy of the project.

In the right location and with a well considered design, this has proved an extremely cost-effective, adaptable and effective technique.

Section of the reach before, showing significant sediment accumulation – 2011



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During construction, just before the planting phase is due to commence – 2011



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One year after restoration showing development of diverse bankside vegetation – 2012

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