

River Wensum Restoration Strategy

Place Farm, Costessey – Reach 3a

At a glance

River restoration benefits: Improved planform, channel cross-section, flow variation and sediment processes.

Drivers for restoration: Addressing the physical modifications of the river to meet the requirements of the Water Framework Directive; restoring the River Wensum Special Area of Conservation (SAC) to 'favourable' condition; contributing to the chalk rivers Biodiversity Action Plan; enhancing the value of the fishery.

Area restored: 1.2 km of the River Wensum from 700m downstream of Taverham Road Bridge (National Grid Reference TG 16437 13334) to the southern extent of the Wensum Fisheries lake complex (National Grid Reference TG 16641 12307).

Environmental impact assessment: No statutory EIA required. As best practice an Environmental Action Plan has been produced.

Project Partners: Natural England, landowner, Wensum Fisheries and Anglian Water.

Construction period: June – September 2018.

Site detail

This scheme is part of implementation of the River Wensum Restoration Strategy (RWRS). The River Wensum in Norfolk is nationally and internationally important for wildlife.

The ecological value of the river is recognised through its designation as a Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC).

The RWRS is a whole river project that has been developed by the Environment Agency, Natural England and the Water Management Alliance. The aim is to implement a range of restoration techniques to improve the form and function of the Wensum to enable it to support the flora and fauna typical of a Norfolk chalk stream.

The Costessey scheme (Unit 54, Reaches 3a and part of 3b from the feasibility studies) covers 1.2km of channel, from 700 metres downstream of Taverham Road Bridge to the southern extent of the Wensum Fisheries lake complex.

The conceptual designs contained within the feasibility study for Unit 54 of the SSSI (Taverham to Hellesdon) have been used as a starting point when developing the detailed design. The scheme has to be compatible with the agricultural and recreational land use of the adjacent floodplain. Working closely with the landowner and fishing club the scheme design strives to balance different aspirations.

Important restoration measures incorporated in the detailed design included the construction of lateral berms, introduction of glide-pool sequences, use of woody material, creation of off-channel refuge areas and tree planting.

A river tends to erode a pool on a bend, transporting the material only as far as it has the energy to do so. This usually results in a gravel glide, riffle or shoal depending on the flow regime. On the Wensum, with its gentle gradient and high base flow, there is rarely anything but glides. The new glides have generally been placed downstream of bends to match natural form. We have also considered the existing bed levels and the glides have been located in areas with higher bed levels, minimising the amount of material required.

The gravel glides have been created using material imported from a local quarry. The glides provide valuable spawning habitat for fish (e.g. barbel, chub and bullhead) who take advantage of the well oxygenated, higher velocity flows. They also create suitable habitat for a range of invertebrates, including stoneflies, caddis flies and white-clawed crayfish.

In four locations cattle drinking areas have been formalised using chalk to create a firm surface to reduce poaching and help minimise sediment entering the river. These shallow areas of open water also provide valuable refuge and nursery habitat for fish fry.

The scheme includes the installation of woody material features to help stimulate variation in the flow regime and help restore the natural form and function of the channel.

We usually look to source woody material from the site, however this has not been possible because of the absence of suitable material available on this stretch. The Holkham Estate kindly agreed to donate material allowing us to install a number of woody deflectors on the scheme.

The river corridor is largely devoid of trees, which reduces both riparian and in-stream habitat complexity. We have planted 100 trees (native species appropriate to the site) along the reach. In the long-term these will improve bank stability, create a diversity of light and shade conditions and provide a potential source of woody material to the river, improving physical habitat and providing cover for fish.

We completed a comprehensive flood modelling study which concluded that the restoration work has no impact to developed land, or people and property. The study demonstrated no impact to land located upstream and downstream of the works.

Environmental initiatives

The design philosophy aims to maximise the ecological potential of the present day system by kick starting natural processes. The proposed restoration measures will act as a catalyst, enabling the river to return to a more natural form and function, benefiting local ecology and target communities.

No waste material has been taken from the site, thus reducing the potential effects on local traffic as well as reducing the carbon impact of the scheme.

Traditional restoration schemes have tended to take place between late August through to March to avoid the main fish spawning and breeding bird seasons. We commenced works earlier in the year and this necessitated a carefully planned and stringent programme of ecological mitigation measures.

Environmental benefits

The restoration scheme has increased the habitat and flow diversity which will benefit a number of environmental receptors including:

- Geomorphology – naturalisation of river form and improved floodplain connectivity;
- Fish and aquatic invertebrates;
- Aquatic plants (water crowfoot plant communities);
- Water vole;
- Otter.

In so doing, the restoration scheme has contributed to the SSSI and SAC achieving favourable ecological condition, has contributed towards attainment of Good Ecological Potential under the Water Framework Directive, and improved the local landscape character.



Newly created gravel glide (left) and cattle drink (right).



Imported chalk used to create hard surface to reduce sediment input from cattle poaching. The shallow warm water will provide a fry refuge habitat.