Engineering consultants Mouchel is working with Atkins (responsible for ecology) and Potterton Associates (responsible for landscape design) to deliver the project. Implementation of the landscape and nature conservation management plan prepared by Atkins and Potterton Associates in 2007 has resulted in ecological enhancement and mitigation involving valuable habitats and legally protected species – water voles, badgers, newts and nesting birds.

The principal green infrastructure elements include the retention of boundary hedgerows and ancient woodland together with the enhancement of existing copses, ponds and watercourses and the creation of footpaths. Habitat translocation of fen / swamp vegetation, as well as sections of hedgerow and a young oak tree, has enabled these features to be retained within the site albeit in different locations.

*Translocation of fen / swamp vegetation*
The fen / swamp vegetation had developed on heavy clay soils and was dominated by reed sweet grass with great willowherb and tufted hair grass, as well as soft rush, meadowsweet, lesser pond sedge and brooklime. The translocation was undertaken in September 2007 using a tracked 360° excavator with a digger bucket to take approximately 500 $m^2$ as turfs from the wetter areas of the fen / swamp vegetation as these had the greatest ecological value (Figure 11).

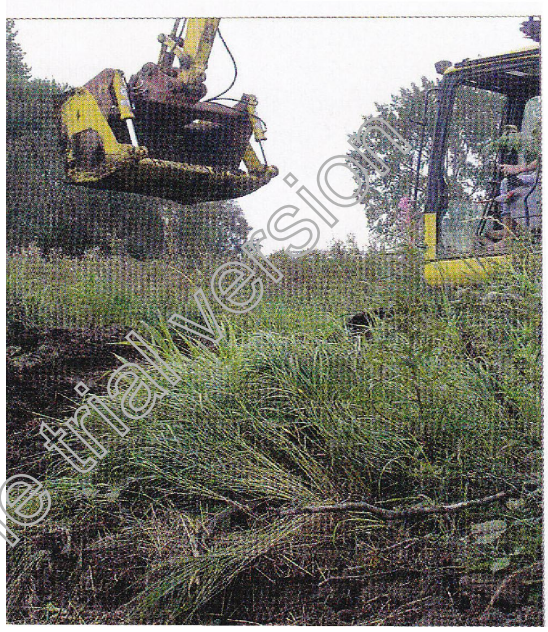


Figure 11. Digging up selected wetland plants at the Wolverhampton site in September 2007

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The turfs were placed at four locations within the receptor site to 'seed' it with Wetland plants. The receptor area was a large expanse of low-lying land which had been previously shaped and compacted as a surface water attenuation area. This area receives surface water drainage from the i54 site as the final stage in a sustainable drainage system involving a series of newly created swales and ponds along a watercourse that runs through the site and discharges into the adjacent brook.

The whole of the i54 site is subject to the local landscape and nature conservation management plan, which includes annual monitoring in spring and summer with an annual report being submitted to the planning authority and other interested parties as part of planning conditions. Monitoring of the fen / swamp vegetation in 2008 and 2009 showed very successful re-growth of aquatic plants. Much aquatic vegetation appears to have developed of its own accord from the existing seed bank plant roots in this area. However, the translocated turfs clearly stand out as areas of more established vegetation and provide structural diversity within the new wetland habitat.

The vegetation was originally classified as reed sweet grass swamp before translocation and the vegetation can still be classified as this community in 2009. This surface water attenuation area is not yet receiving surface water runoff as the development plots are yet to be constructed. As a result, a mosaic of habitats has developed, with wetter areas indicated by brooklime and drier areas with meadowsweet and great willowherb (Figure 12). Nettle, broad-leaved dock and spear thistle are also present but these species are expected to decrease as the area starts to receive surface water runoff and becomes wetter.



Figure 12. Fen and swamp vegetation in the surface water attenuation area at wolverhampton in 2009

Mallard and lapwing have been recorded and, in 2009, three pairs of snipe and two pairs of little ringed plover nested in this area.

*Translocation of hedge and oak tree*

Two 120 m long sections of hedgerow were translocated in late October / early November 2006 together with a small oak tree about 10 m high and around 40 years old. These were moved to the western boundary of the site, where they linked to existing hedges that were strengthend with new hedge planting to create continuous wildlife corridors around the i54 site boundaries.

Both hedgerow sections were heavily coppiced before translocation. A receptor trench was excavated by a 360° tracked excavator which then moved the hedge in 2 m long sections using a toothed bucket ; a power saw was used to cut roots and branches where necessary. The excavator also moved the oak tree by easing it slowly from the soil and moving the whole tree together with its root ball. The hedgerow sections and the tree were placed in the receptor trench and immediately backfilled (Figure 13). After-care comprised watering in dry periods.

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Figure 13. Hedge and 10 m tall oak tree immediately after translocation at the wolverhampton site in October 2006