

# A Case Study in Sustainable Drainage Systems: **M74, Dumfries & Galloway, Scotland**

**T**he M74 motorway is located in Dumfries & Galloway, South West Scotland where dual carriageway upgrading to 6 lane motorway has been built adjacent to high quality water courses, the River Annan and Kirtle Water. In the mid nineties, when the M74 was being built, serious pollution of rivers occurred. This was as a result of discharge during construction of large quantities of suspended solids due to the erosion of soils. The contractors were prosecuted and fined up to £40,000 (sterling) for pollution of the River Annan, a designated Salmonid Water. In addition there was huge public outcry.



*M74 construction led to pollution of the River Annan which spread rapidly.*

**T**he financial outcome served as a deterrent for other contractors. Subsequently, the regulator and the National Roads Directorate agreed on special requirements for water pollution prevention which are included in all conditions of contract, obliging civil contractors to undertake certain measures throughout construction to prevent pollution. Furthermore the contractor is required to consult with the regulator prior to beginning work to ensure pollution mitigation is discussed in advance.

Subsequent upgrading contracts incorporated pollution mitigation measures, the most popular of which were settlement lagoons which proved successful in preventing pollution. Better working methods were agreed and implemented in conjunction with the lagoons.

**F**ilter drains were installed along the length of the M74. They were found to be effective in reducing the stormwater volume to be dealt with but were insufficient for pollution attenuation on their own. Polluting discharges to watercourses were visible for 1 km downstream and probably detectable further. It was clear that a treatment/management train approach was required. Construction stage ponds were introduced to the drainage system to function as retention ponds.



*Polluting discharge from filter drain, M74.*



*Settlement lagoons installed during construction; retained for permanent use.*



- ◆ Native trees provide roadside screening.
- ◆ Cheap, cost effective, low maintenance.
- ◆ Habitat creation for wildflowers, frogs, bird and insect life.

- ◆ Ponds can be isolated in case of accidental spillages.
- ◆ Contractors, who built the ponds, were responsible for maintenance during construction.



- ◆ Fish & otter pass within culverted section allows safe migration of wildlife.

**R**iver diversions with meandering channel design and landscaping were constructed in lieu of traditional culverted structures.

Gravel deposits built up on the river banks within a year of construction.

Large boulders of local stone were used to stabilise the river banks.

It is apparent that pollution mitigation can generally be easily provided at relatively little extra expense compared to the overall cost of the road construction project.



*River Annan Diversion*



*Best Management Practices allows the River Annan to remain pollution free.*

## SUMMARY

- ◆ Treatment Train approach incorporating good management practices required to prevent pollution.
- ◆ Pollution mitigation at low relative cost.
- ◆ Provides habitat and amenity value.
- ◆ Provides flood control.