LATEST PROJECTS
SOLVING POLLUTION PROBLEMS

EASTERN HIGH SCHOOL

Eastern High is a new school for secondary and further education in Cardiff and is the first site in the UK to use SDS Aqua-Filter™ separation and filtration units.

DIRFT

Daventry International Rail Freight Terminal (DIRFT) is the UK’s largest rail-linked logistics development and features multiple SDS Aqua-Swirl™ hydrodynamic vortex separators.

LUTON AIRPORT

London Luton Airport is equipped with SDS Aqua-Swirl™ AS-8 separators, the largest units supplied to date by SDS.
Pollution from urban highways, trunk roads and motorways poses significant risks to the environment from toxic metals and hydrocarbons that are carried in surface water runoff. The risks are well-documented and the regulatory tools are in place, yet outfalls are inconsistently monitored and controlled. Here, we look at tools and techniques available to tackle the problem.

**Getting to Grips with... highway pollution**

**JO BRADLEY  MARKET DEVELOPMENT MANAGER SDS LTD**

**HIGHWAY RUNOFF Q&A**

**Q: How does road runoff affect water quality?**

**A:** Rainwater washes pollutants from the road surface into the drainage network and, during peak and prolonged rainfall, into the receiving rivers and streams. Although highway runoff is frequently considered as diffuse pollution, it’s more often point-source outfalls that lead to cumulative, chronic pollution and build-up at the bottom of rivers and streams.

**Q: What causes the pollution?**

**A:** The pollution is caused by tyre erosion, dust from brake and clutch pads, engine wear, exhaust emissions, and oil and fuel leakages. Suspended solids settle out in rivers and streams, blocking up gravel where fish spawn and limiting light penetration. Hazardous pollutants are bound to the sediment and dissolved in the surface water.

The pollutants of most concern for the aquatic environment are metals, particularly copper and zinc, and a spectrum of chemicals known as polyaromatic hydrocarbons (PAHs), including benzo[a]pyrene.

**A:** At the Highways Agency (now Highways England) and in cooperation with the Environment Agency (EA), a list of ‘significant pollutants’ in highway runoff and, in Europe, the Water Framework Directive sets out Environmental Water Quality Standards (EWS) for some of these significant pollutants.

The data from the Highways Agency monitoring study revealed that the EWSs are often exceeded in runoff from busy trunk roads and motorways.

**Q: What is the extent of the water pollution?**

**A:** Road and urban highway runoff can be a point source, rather than a diffuse, pollution problem.

Motorway outfalls mean that highway run-off can often be a point source, rather than a diffuse, pollution problem.

**Q: What is the extent of the water pollution?**

**A:** Highways England and the EA do not routinely monitor for benzo[a]pyrene in the water environment. However, the Highways Agency Water Risk Assessment Tool (HAWAT) was developed as a model to remove the need for expensive and time-consuming monitoring and to indicate a risk of failure of water quality thresholds. HAWAT concludes that more than 2500 outfalls in England pose a very high or high risk of pollution. Assuming the outputs from the model are reliable, the risk of water pollution is very real and extensive.

**Q: Who is responsible?**

**A:** Ownership of highway outfalls in the UK is spread across Highways England, Transport Scotland, the Welsh Government, Transport Northern Ireland, local highways authorities, private land owners and Water and Sewerage Companies (WASCs).

In urban areas, runoff from local authority roads frequently ends up in a surface water sewer owned by the WASC. Vehicle manufacturers, road users and governments all have a responsibility to take steps to reduce the pollution being generated. Since many manufacturers manufacture, test and market vehicles, all have a responsibility to take steps to reduce the pollution being generated. Since many manufacturers manufacture, test and market vehicles, all have a responsibility to take steps to reduce the pollution being generated. Since many manufacturers manufacture, test and market vehicles, all have a responsibility to take steps to reduce the pollution being generated. Since many manufacturers manufacture, test and market vehicles, all have a responsibility to take steps to reduce the pollution being generated. Since many manufacturers manufacture, test and market vehicles, all have a responsibility to take steps to reduce the pollution being generated. Since many manufacturers manufacture, test and market vehicles, all have a responsibility to take steps to reduce the pollution being generated. Since many manufacturers manufacture, test and market vehicles, all have a responsibility to take steps to reduce the pollution being generated.

**Q: How effective is regulation?**

**A:** There is a patchwork of regulations covering the devolved regions of the UK, which is enforced to a lesser, or greater, degree. Scotland is the most advanced, and successful, in applying Sustainable Drainage Systems (SuDS) under the Water Environment (Controlled Activities) Regulations (2011). SuDS are common on runoff outfalls and there is an extensive network of filter drains across the road network.

In England and Wales, the Environmental Permitting Regulations (2016) give the regulators powers to require highways authorities to apply for a permit where there is a risk of water or groundwater pollution. In practice, the regulators mostly rely on voluntary improvements and, while it’s encouraging that treatment schemes are being introduced on the highest risk outfalls without permits, such interventions are limited and inconsistent and no monitoring is taking place to see if they are adequate.

**Q: How much maintenance is required?**

**A:** Insufficient maintenance can be the ‘Achilles heel’ of SuDS and it is essential that every device, whether vegetative or manufactured, is maintained and operated properly, or it will quickly become ineffective.

Manufactured devices offer the advantage of predictable maintenance regimes as well as measured and proven performance. Under field test conditions completed in 2012, the SDS Aqua-Swift achieved 80% removal of total suspended solids, where a large unit was installed to allow for infrequent, large storm events.

When smaller units are installed to treat more frequent, smaller rainfall events, removal efficiencies of 50% total suspended solids are achieved and offer a significant improvement in run-off quality. On more challenging sites, or where space is at a premium, a hydrodynamic vortex separation and filtration system, such as the SDS Aqua-Swift, can be installed to reduce the copper and zinc pollutant load.

**Q: What happens next?**

**A:** While Westminster has been procrastinating with legislating for SuDS in new development through planning, more stringent regulation and penalties are routinely applied to control water quality discharges by WASCs from wastewater treatment. As we move towards developing a new legal framework and a 25-year plan for the environment post-Brexit, improved monitoring and control of highways must be a priority.

About the author: Before joining SDS, Jo Bradley worked for much of her 25-year career at the Environment Agency, identifying and preventing pollution in highway run-off.