

Aggregate Industries

Pavements to sustain an unflooded future

Aggregate Industries believes conflict between building development and flood risk can be averted by constructing pavements that incorporate its sustainable drainage system.

It seems the built environment can be developed in harmony with its rained upon, natural surroundings and some pavement suppliers are well placed to help it happen. Aggregate Industries is ideally positioned at the forefront of technology emerging to help developments go forward without causing greater risk of flooding and the pollution of water courses.

The company is supplying and installing products that when combined, create pavements that provide Sustainable Drainage Systems (SUDS). The designs are innovative, based on substantial research and development, and meet exactly what is needed in a fairly straightforward way.

SUDS are what central Government, the Scottish Environmental Protection Agency (SEPA) and the Environment Agency (EA)

want developers and authorities to adopt. More rainfall is collected by new buildings and pavements as housing and commercial developments grow. But directing the additional water without control into already overloaded existing drainage infrastructure raises the risk of flooding, especially at times of heavy rainfall.

The SUDS philosophy is all about using more sustainable ways of handling and cleaning this extra surface water runoff. It is central to Government policy on prevention of pollution and flooding and use of the systems is being encouraged through local planning guidance.

Research reports for SEPA, EA and others, talk of adopting the 'Management Train' principle whereby heavy flows of water are dealt with at various stages – as it collects on

the ground or roofs, within a site boundary in ponds, or regionally in reservoirs.

"Management Train is an hierarchy of techniques. It is sensible to develop SUDS at each stage of drainage infrastructure when opportunity arises, although further into a drainage system, water handling and cleaning methods tend to be more complex and expensive," says Aggregate Industries' Research Manager Bob Allen.

"The primary SUDS technique is source control, which involves dealing with heavy flows of water as it collects and runs off roofs, roads and car parks. As a leading supplier of the pavements that rainfall falls on, we have an important role to play in SUDS. Our systems can provide developers and authorities with a suitable source control SUDS pavement for virtually any situation."

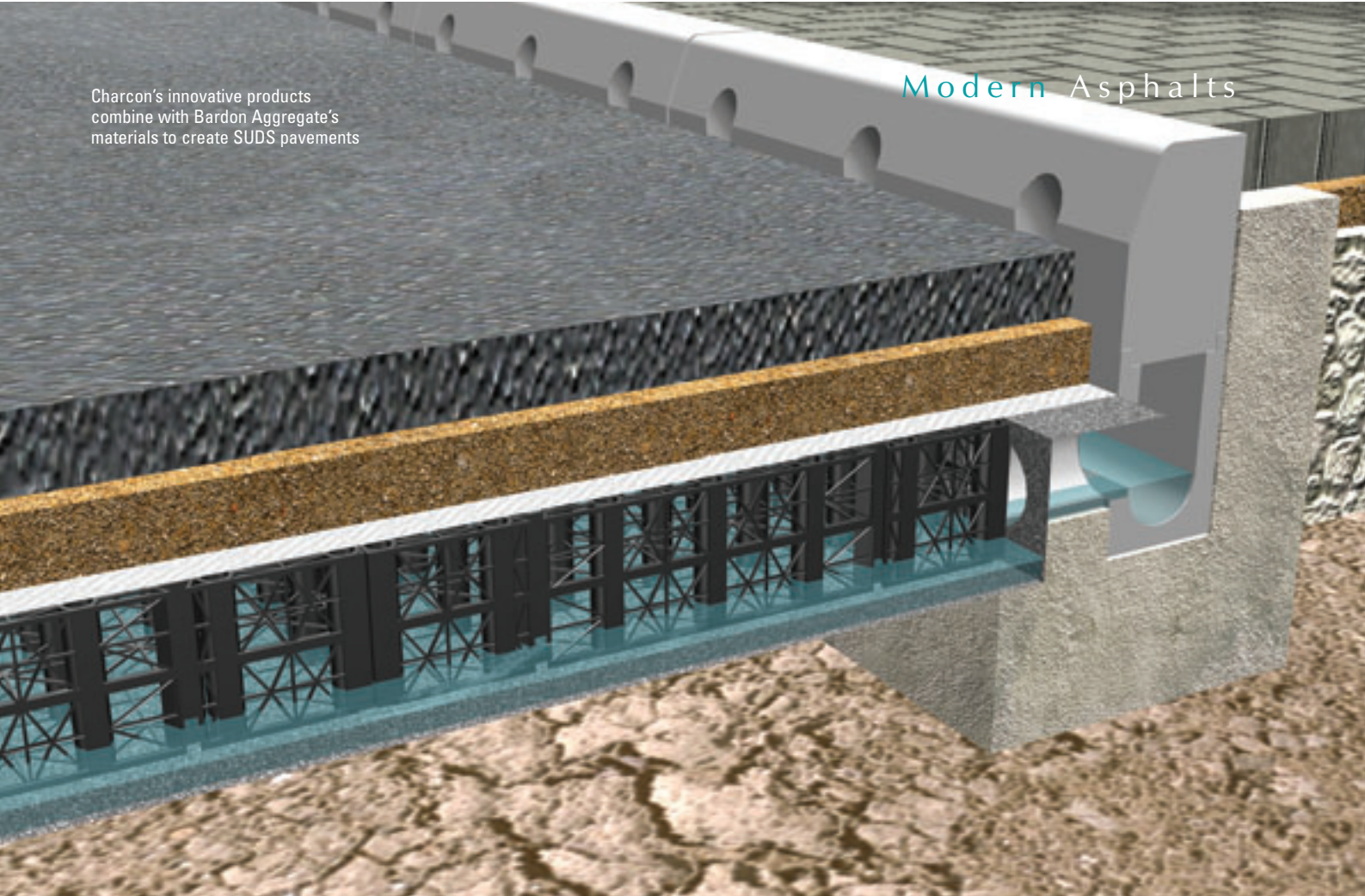
Aggregate Industries has developed attenuation and infiltration source control SUDS, both of which prevent flooding by providing water storage capacity within the pavement itself. The attenuation option holds and then directs the water into conventional pipework in a controlled manner as the rainfall subsides, whereas infiltration SUDS disperse the water by allowing it to gradually seep into the ground.

Aggregate Industries has developed modular SUDS pavements, using different methods and combinations of products from various Aggregate Industries companies, such as Bardon Aggregates, Bardon Concrete and Charcon, to collect, hold and clean the water.

One of the most innovative products for holding surface water runoff is Charcon Permavoid, which is essentially a rigid and hollow cellular plastic box that can replace all



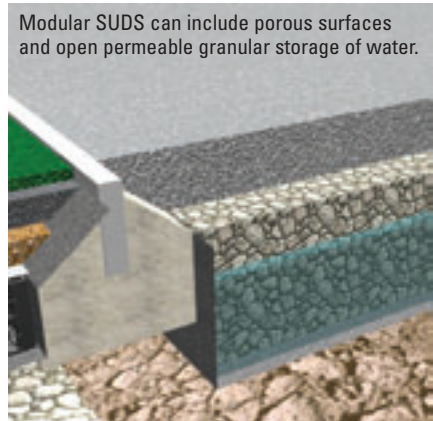
Nottingham East Midlands Airport has made use of attenuation and infiltration SUDS



or part of the sub base layer. Any number of Charcon Permavoid boxes can be linked together to form the crucial water retaining layer, or reservoir, within a SUDS pavement.

"Charcon Permavoid boxes are 150mm deep and have been designed to fit within the sub base layer of a conventional pavement. Granular material can be used as the reservoir, but a layer of compacted stone typically has to be three times as thick to hold the same quantity of water, so use of Charcon Permavoid represents considerable savings in pavement thickness," Allen says.

Aggregate Industries' modular SUDS can also have permeable or impermeable asphalt, concrete or block paved surfaces. Bardon Aggregates' porous Drainasphalt allows water to permeate straight through the pavement layers into the Charcon Permavoid or granular water storage layer.



Modular SUDS can include porous surfaces and open permeable granular storage of water.

Or, conventional impermeable asphalt can be used and the water runs into Charcon Permakerb or Charcon Permachannel concrete products, which then collect and treat the water prior to discharge.

"Our systems can provide developers and authorities with a suitable source control SUDS pavement for virtually any situation." Bob Allen

"We have recently built both attenuation and infiltration SUDS pavements with combinations of porous and nonporous surfaces at Nottingham East Midlands Airport (NEMA)," says Allen. "The first contract last year used Bardon Drainasphalt as a single course surface layer in central car parking bays, which were surrounded by an impermeable pavement.

"The porous areas were laid at low points to collect surface water runoff and transfer it into a Charcon Permavoid system below. A subsequent and larger contract has used Charcon Permachannel which collects water from the perimeter of a nonporous asphalt surface and transfers it to an underlying Charcon Permavoid structure."

The approach taken to the airport projects is fairly typical of SUDS source control developments. Additional car parking capacity was needed for the expanding

airport, without placing extra burden on the existing drainage system and with minimal impact on the local environment.

"A combination of SUDS pavements was the best way forward at NEMA. The varying size of the car parks and the underlying soils were sufficiently permeable to allow some infiltration," Allen says.

A supply and installation service was provided at NEMA, with pavement construction by Bardon Contracting. Other products used include Charcon Geotextiles for preventing cross-contamination of granular materials and Charcon Geomembrane for keeping the attenuation pavement watertight.

Charcon Permaceptor – a cellular oil interceptor that can be incorporated into the Charcon Permavoid layer – was also considered. "Water treatment is an important issue when designing SUDS," Allen adds. "Studies have shown that the natural bacteria in SUDS pavements will break down hydrocarbons and clean the water as it soaks through.

"If risk of oil or fuel spillage is relatively high, such as at a vehicle service station or lay-by, Charcon Permaceptor can be used to intercept the pollutants as a lower cost and more efficient alternative to normally specified Class 1 interceptors."