ACO Water Management

Buckshaw Village Chorley, Lancashire

Highway SUDS scheme one of the first to be fully adopted by UK Authority.

The redevelopment of the former Royal Ordnance munitions works in Chorley, Lancashire is the location of one of the first sustainable highway drainage schemes to be fully adopted by a UK local authority. Key to its success has been the innovative use of ACO KerbDrain.

The former Royal Ordnance munitions works is one of the largest brown field development sites in the country. Acquired from BAE Systems by developers Redrow and Barratt, the 395 acre site has been transformed into an environmentally sustainable urban village.

In granting permission to develop the site both Borough and County Councils stipulated that the existing site access had to be upgraded to relieve the predicted increased traffic loading on the surrounding villages and on the main A49 link to the M6. Combining this within Redrow's commitment to include the highest degree of sustainability in its development of the site lead to a Sustainable Urban Drainage System (SUDS) being proposed for the new site access.

Project:
Buckshaw Village.

Objective:
Use of SUDS techniques to remove all standing water from new access road to landmark housing development.

Brief:
1. System to minimise below ground infrastructure.
2. Low-carbon, locally sourced recycled materials to be used.
3. Easy to install, clean and maintain.

Solution:
By selecting the shallow invert ACO KerbDrain 305 system, designers were able to minimise the depth of swale required and configure the inlet locations to control the velocity of flow within the swale to prevent scouring and optimise primary filtration.

The adopted design introduces swales on both sides of the carriageway along 80% of its 2km total length. Each has a depth of between 400 and 800mm and an effective width of 2.5m. The profile provides the required attenuation and groundwater recharge characteristics to cope with the surface run-off from a 100 year storm. Seeded with a hard-wearing grass, the velocity of the water is minimised and the primary filtration improved within the swale by maintaining a cut length of 50mm.

As ground levels across the site do not fluctuate significantly, the majority of the swales achieve near static attenuation of the run-off by simply following the contour of the road surface. However, a short section of the road close to the link with the main A49 has a gradient of 1 in 20. Under heavy rainfall conditions, run-off velocity within the swale would cause 'scouring' of the surface and potential flooding downstream. This has been overcome by 'stepping' the bottom profile of the swale, effectively reducing the overall gradient to 1 in 80.

Critical element of the design

"A critical element of the design is the method used to control the flow of run-off into the swale," says Steve Openshaw, technical manager at Redrow. "We needed a system that would be easy to install and maintain, minimise visual impact and not require any additional excavation within the proposed swale. It would also need to allow surface water to return to ground as close to the point at which it fell – a vital criteria for SUDS.

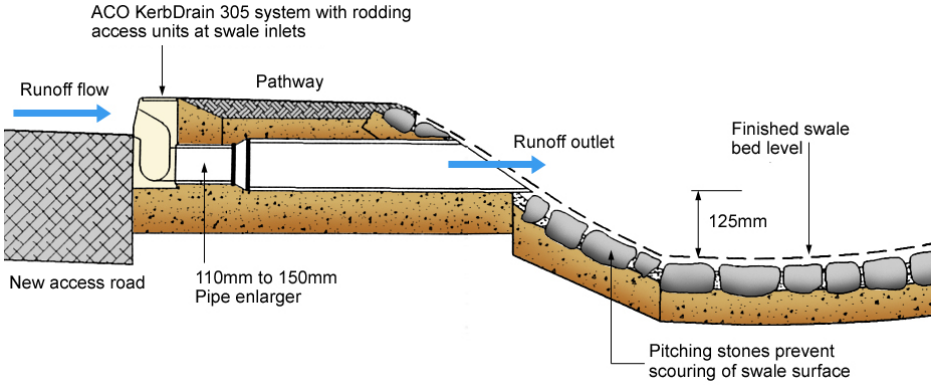
"ACO KerbDrain provided the exact characteristics required for the vital link between the road surface and the swales. Its inlet configuration allows for a faster, more even removal of surface water and connections to the swales have been easily made using the punch-out sections on the back face. These provide complete design flexibility, allowing the short connection pipes to be positioned at any point along the installed KerbDrain run."

A further advantage came from the system being manufactured a range of sizes. The mid-capacity KerbDrain 305 unit has a reduced overall height of just 305mm. Originally developed to ease installation around utility services, the effective 'raised' height of the rear outlets meant that the depth of the swale could be reduced – minimising excavation, reducing visual impact and speeding up installation.

"The flexibility of KerbDrain meant that we could adapt the outlet configurations easily to suit the landscaping, place rodding access points to ease maintenance and install the overall system far quicker and far more cost effectively than we had anticipated – all factors that have helped in winning adoption of the final scheme," says Steve Openshaw. "This access road is just the first of many sustainable development schemes that will be introduced across the site to create a completely harmonised residential, commercial and leisure environment."

The shallow inlet created by using KerbDrain 305 has minimised swale depth.

Maintaining a grass height of 50mm optimises primary filtration within the swale.



Cross section through a typical swale inlet. Connections between the short carrier pipe and the installed ACO KerbDrain run are easily made using the punch-out sections that are cast into the rear face of each KerbDrain unit.

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