

Derby Midland Station, retrofit tree pits, Derby

Location

Midland Station Interchange, Derby

Description

Derby City Council laid out a plan to modernize the entrance and improve facilities at Midland Station, a major hub for the Midland Main Line. In addition to other improvements, they wanted to both grow large trees and attenuate water on site. The site had a limited drainage system that served the area poorly and was easily overwhelmed by storms, causing water to escape and flow over the footway and into the highway drainage systems, presenting serious issues for pedestrian and vehicular traffic.



Figure 1: Tree pits

The design team elected to create a new bus interchange at the main frontage of the station that included a traffic island on which 5 Silver Birch trees were planted. Below the ground, the traffic island was filled with a two-layer deep tree pit system that serves as a storage zone for runoff from the station's roof and surrounding area (see figure 1). This new drainage system combines existing flows and runoff to provide attenuation for all proposed storm events while also supplying a regular, natural irrigation supply to the new planting areas on the traffic island. Each tree receives 10 cubic metres of soil; the system helps capture water from a 4,000 square metre catchment area.

How it works

The site's existing gullies, pipework and silt-trap/interceptor were decommissioned and a new carrier drain and channel was installed. The new carrier drain is 225mm in diameter, approximately 100m in length, and collects surface water runoff from an impermeable area of approximately 0.22 Ha. At its lower end, the carrier drain enters a chamber with a flow control and 500mm silt trap sump just inside the planting area. The ongoing flow is restricted by means of a 100mm pipe that results in a buildup of water within the chamber. A 225mm diameter high-level outlet allows dissipation of the flows into a slotted pipe, and from here into a dedicated filter zone. From here the flows pass into the two-level soil storage area provided by the tree pit system. A backfill of angular stone lines the perimeter of the tree pit system, allowing water to pass through the soil and stone to reach a 150mm perforated pipe that provides a controlled outlet from the storage into the existing system where it joins roof runoff from the existing station building.



Figure 2: Construction of tree pit

SuDS used

Tree pits

Team and details

Installation type: Integrated - Trees and stormwater

Project designer: Derby City Council

Main contractor: Ringway

Contact for further information: DeepRoot Urban Solutions