Hopwood Motorway Service Area, Worcestershire

SuDS used

- Grass filter strip
- Stone collector trench
- Spillage basin
- Grass swale
- Balancing ponds
- Wetland ditch
- Wetland treatment
- Sub-surface collector trench

Benefits

- Control of volumes and flows on site.
- Acceptable clean water entering the natural drainage system.
- Protected wetland features provide visual and wildlife resource for the site.
- The cost of drainage maintenance has been reduced.
- The series of ponds, wetlands and low flow channels form a SuDS walk for visitors with information boards to explain.

1. Location

The Hopwood Park motorway service area (MSA) is situated at Junction 2, on the M42, where the A441 crosses the motorway.

2. Description

The MSA comprises an amenity building surrounded by car parking, coach parking and a dedicated HGV park with a centrally located fuel filling area. The MSA is enclosed in a series of planted banks and falls northwards to the Hopwood Stream which flows eventually to the River Arrow.

The site comprises 34 hectares of which 9 hectares is the MSA and 25 hectares a wildlife reserve. A stormwater ditch draining the adjacent A441 divides the MSA into 2 sub-catchments, the HGV Park and the remainder of the MSA.

3. Main SuDS components used

- Grass filter strip
- Stone collector trench
- Spillage basin
- Grass swale
- Balancing ponds
- Wetland ditch
- Wetland treatment
- Sub-surface collector trench

4. How it works

4.1. The HGV lorry park

- Water is collected across a grass filter strip to trap silt;
- 10mm first flush runoff enters a stone collector trench which treats oils and other pollutants naturally;
- a spillage basin (see figure 1) with wetland treatment zone and outlet valve isolates any spillage event;
- heavy rain passes across the trench into a grass swale;
- balancing pond 1 with marginal wetland treatment zone receives all water before release into the wildlife reserve wetland.

Figure 1 Spillage basin newly constructed (Bob Bray)

4.2. Main access road, fuel filling area and coach park

- A proprietary silt and oil interceptor begins treatment to runoff which has been collected by conventional gully and pipe drainage;
- 2 spillage basins with wetland treatment zones and outlet valves isolate any spillage event;
- a constructed wetland (see Figure 2) cleans 10mm first flush runoff with an additional outlet valve to isolate any spillage event;
- a wetland ditch, receiving water at a controlled rate to prevent erosion, conveys treated first flush runoff to balancing pond 2 with a marginal wetland treatment zone;
- a bypass swale collects storm overflow and conveys it parallel to the ditch over the rip-rap cascade into the pond;
- balancing pond 2 and treatment wetland receives all water as the last link in the management train before release to the stilling area and the Hopwood stream.

Figure 2 Constructed wetland (Bob Bray)

4.3. Car park

- a sub-surface collector trench treats the 10mm first flush runoff;
- a bypass channel conveys excess stormwater directly to the pond;
- a pipe outlet delivers all runoff to balancing pond 3 and marginal wetland treatment zone before release to the stilling area and the Hopwood stream.

4.4. Amenity buildings

- clean water is piped directly from the roof to a feature balancing pond with marginal wetland planting (see figure 3);
- a cascade, controlled by a slot weir, falls to the stilling area before it flows to the Hopwood stream.

Figure 3 Feature pond receiving roof water (Bob Bray)

All balancing ponds discharge through flow controls to the stilling area and clean water flows into the Hopwood stream at a greenfield rate of runoff.

4.5. The SuDS management train concept

Areas considered to pose a pollution risk to the environment have used the management train concept in full to ensure good water quality and to deal with unforeseen spillage events.

The HGV park and the fuel filling area, coach park and service yard pose a serious pollution risk and have an extended management train.

The car park and amenity building roof water were considered less likely to cause pollution and therefore have progressively shorter treatment systems although the concept is applied generally to provide insurance against unforeseen spillage events.

5. Specific details

The MSA was designed to meet a 1 in 25 storm return period and greenfield runoff rate of 5l / sec / hectare.

Runoff from the HGV park is directed to a tributary of the Hopwood Stream via the Wildlife Reserve to enhance a pre-existing wetland and help sustain base flow in the watercourse.

Open wetland systems are protected by pretreatment features including filter strips, treatment trenches or separators to reduce pollution or silt loading and prevent catastrophic damage in the event of spillage.

Wetland basins are lined completely where designed to treat runoff or partially where a retention volume is required in the pond feature.

6. Design & construction

The design of Hopwood Park MSA was undertaken before the publication of the CIRIA design manuals and followed guidance from the Environment Agency and a review of stormwater management manuals from the USA.

The site has been monitored since construction to evaluate performance and costs.

- The Environment Agency has monitored the control of chemical pollution;
- The Ponds Conservation Trust has evaluated the wildlife value of the wetland system with preliminary conclusions on SuDS effectiveness for water quality;
- The Maintenance Costs have been reviewed by Robert Bray Associates to show benefits compared to conventional drainage;
- Further review work has been undertaken by HR Wallingford and Edinburgh University.

7. Benefits

- Control of volumes and flows on site with discharge to the Hopwood Stream at greenfield runoff rates;
- SuDS components used in series; the management train, ensures acceptable clean water enters the natural drainage system;
- Protected wetland features to manage runoff provide a visual and wildlife resource for the site;
- The cost of drainage maintenance has been reduced, by using the Landscape Contractor to manage the site;
- The series of ponds, wetlands and low flow channels behind the Amenity building now form a SuDS walk for visitors with information boards to explain the Sustainable Drainage approach to managing rainfall on development sites;
- The SuDS components are robust and withstand damage and lack of maintenance without failure.

8. Project details

Construction completed: 1999

9. Project team

Client: Welcome Break

Engineers: Baxter Glayster Consulting

SuDS design: Robert Bay Associates