

Bio Retention Filter with an upstream Storm Water Overflow Basin and a Inflow Bridge as Connection Element



BAUERUmweltgruppe

Client: Public Services Schwalmstadt, Germany

Engineering Design and Supervision: Ing.-Büro Oppermann GmbH, Vellmar

Scope of Works: Building of a Bio Retention Filter Basin and a Storm Water Overflow Basin with interposed Flume including all Pits and the Duct System.

Contract Period: October 2004 until June 2005



Project

On the premises of the City of Schwalmstadt, where the pumping station of the sewage purification plant can be found, a bio retention filter unit is about to be built. Since the inlet to the sewage purification plant is limited, in case of larger rain events the surplus water is led into the receiving canal. In order to avoid pollution of the receiving canal in the future, the retention soil filter plant is interposed now. The remedial action serves to reduce the occurring water amounts during flood events.



The filter body consists of a drainage layer (consisting of drainage pipes and drainage gravel) and a filter layer (drainage sand with a specific grain size distribution).

Site

The plant serves as release system for the existing combined sewer system. The water is finally lead into the Grenzebach and thus back into the original water cycle in biologically perfect condition. Thus the City of Schwalmstadt has chosen an highly innovative way of sewage water purification.

Result

For building the basins extensive earthwork is necessary. At first the excavation pit for the rain water overflow basin was enclosed by a sheet pile wall and then excavated. A concrete basin with a diameter of 10 m was constructed. Afterwards the excavation pit was re-filled and the area was heaped-up to the upper edge of the basin. Due to the depth of the excavation pit and the proximity of the Grenzebach the occurring groundwater was collected during the entire construction period by means of drainage and pumps and drained off. For a stable foundation of the storm water overflow basin soil exchange measures became necessary.

A basin of 55 m x 45 m is excavated and modelled for the construction of the retention soil filter, starting from the surface. On the subgrade level which has to be established a sealing is placed in. The sealing consists of a HD-PE-foil with a strength of 2.0 mm. This is protected on both sides with a geotextile (400 g/m²) and integrated into the dams which will be filled up. Thus the foil is durably protected against UV radiation and mechanical damage without additional measures. The drainage and ventilation of the filter body are carried out with a combined system of drainage pipes, drainage gravel and a floor drain. In addition a control station is installed within the basin, where the water level can be supervised. The filter body consists of a drainage layer, made of drainage pipes and drainage gravel, and a filter layer, made of drainage sand with a specific grain size. 7,500 reed plants are planted into the filter layer. Accompanying the

construction process various drain pipes and pressure pipes are laid, throttle pits for the storm water overflow basin and the bio retention filter are set and attached, as well as all necessary emergency drains are built.



The storm overflow basin is a round container with a diameter of 10 m and a volume of 250 m³. For the construction of the container walls a special drain course was used.