CASE STUDY

Scottish Water, Balhall

Aerated saturated vertical flow: Secondary sewage

Project
Scottish Water, Balhall

Location
Mains of Balhall,
nr Brechin, Angus

Project type
Design and construct

Wastewater type
Sewage

Completion date
March 2012

Treatment
Saturated aerated vertical flow

Needs

The wastewater treatment works at Balhall is operated by Scottish Water and serves a small hamlet and farm in Angus near Brechin. The site originally comprised a septic tank which discharged into a local stream. Subsequently a passive vertical flow reed bed system was installed post septic tank but this struggled to achieve the tight ammonia consent of 5mg/l. Further investigation highlighted an over estimation of the load at the works resulting in a significant oversizing of the system. This had been complicated by the system receiving rain water via roof connections to a newly installed sewer. Some modifications to the wetland system were undertaken but the site still failed to consistently achieve consent. In 2011 Scottish Water Solutions undertook a flow and load survey which more closely characterised the water passing forward to the works for treatment.

		RAW	DISCHARGE CONSENT
Average Flow	(m^3/d)	4.7	–
Peak Flow	(m^3/d)	37.8	–
BOD	(mg/l)	320	25
Suspended Solids	(mg/l)	400	100
Ammoniacal-N	(mg/l)	42.7	5

ARM Ltd was asked to provide a treatment solution with a performance guarantee, based on the new data.

natural wastewater treatment

CASE STUDY continued

Scottish Water, Balhall

Solution

The existing treatment wetland comprised a two reed bed system operating in paralell. ARM Ltd were keen to maximise the use of this existing asset. Because of the stringent ammonia consent and the need for a process guarantee an aerated (FBA™), two stage saturated vertical downflow system operating in series was proposed. This was constructed by conversion of one of the existing reed beds on site, creating two beds of 171m^2 and 25m^2 with a pumping chamber in between. ARM Ltd also installed a new septic tank specifically sized to handle the higher flows associated with roof water catchment and avoid the scouring of solids. Duty standby blowers were installed with a control panel allowing timer controlled operation of the aeration system.

Benefits

Maximum use was made of the existing asset on site and the remaining bed, currently unused, provides potential additional treatment capacity if required in the future. The FBA™ aeration technology provides Scottish Water with a more secure treatment solution to match the tight ammonia consent. Timer control of the aeration system offers flexibility of operation with the potential for optimum power usage. This along with the FBA™ technology gives Scottish Water a lower carbon foot print treatment solution compared to the alternative mechanical treatment solution which would most likely have been a Submerged Aerated Filter.

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