



AMBR MEMBRANE BIOREACTOR

Aquabio AMBR for high strength organics and nitrogen removal from landfill leachate at DEFRA 'foot & mouth' burial site, Watchtree in Cumbria

Aquabio has designed and built an advanced membrane bioreactor plant (AMBR) at the DEFRA 'foot and mouth' burial site at Watchtree in Cumbria. The plant efficiently removes high strength organics, suspended solids and nitrogen to very low levels suitable for EA discharge. Watchtree was developed as a mass burial site for animals culled during the Foot and Mouth epidemic in 2001. The wastewater comes from leachate collected from the burial cells. The new AMBR system discharges to a reed bed system prior to discharge to Pow Beck, via an EA discharge consent. The Aquabio plant provides the required treatment to allow the leachate to be discharged to the existing reed bed system and hence the EA discharge point.

Parameter	Annual Average	Maximum Design	Units
Daily Flow Rate	29	75	m ³ /day
COD Load	290	1500	kg/day
BOD Load	175	890	kg/day
NH ₃ -N Load	25	90	kg/day
COD concentration	10,000	20,000	mg/l
BOD concentration	6,030	11,870	mg/l
NH ₃ -N concentration	860	1,200	mg/l
pH range	7.7	7.65	pH units
Temperature	10	15	°C
Conductivity	6,690		mg/l
Total Alkalinity (as CaCO ₃)	3,150		mg/l



The leachate is transferred to a new balance tank which operates in parallel with the existing leachate storage silo. The tank is mixed and aerated using an Aquabio JETOX system. Following balancing and nutrient addition the wastewater is fed to the AMBR plant, comprising the following stages:-

- 1st stage anoxic treatment for denitrification
- 1st stage aerobic treatment for BOD removal and nitrification
- 2nd stage anoxic treatment for polishing denitrification
- 2nd stage aerobic treatment for polishing BOD removal and nitrification
- Biomass separation using ultrafiltration membranes

The permeate from each membrane is collected and discharged through a flow meter to a collection tank. The permeate is then transferred either to the existing groundwater storage silo, direct to the reed beds, or to the leachate storage silo. Final treated permeate is monitored on line for pH, ammonia, nitrate and suspended solids. If outside of the discharge limits, the permeate will be automatically diverted to the balance tank for re-processing.

Parameter	Operating Target	Discharge Limit	Units
pH range	6 - 9	6 - 9	pH units
BOD concentration	2.5	5.0	mg/l
NH ₃ -N concentration	1.0	2.0	mg/l
Nitrate (as N) concentration	11.3	15.0	mg/l
COD concentration	60	100	mg/l

The Control system includes a Form 4 MCC, PLC, SCADA and ASI communications network. VNC remote monitoring and operation in 'real time' is possible from Aquabio offices in Worcester.



For further information please contact us at Aquabio Limited, Worcester, UK, either by e-mail or fax.

Tel : +44 (0) 1905 641966

Fax : +44 (0) 1905 641977

e-mail : info@aquabio.co.uk

Web : www.aquabio.co.uk