

Heathrow Airport

Aerated subsurface horizontal: Airport run off



Project

BAA, Heathrow Airport

Location

Heathrow, Middlesex

Project type

Upgrade existing works:
Retrofit FBA™

Wastewater type

Airport run off contaminated
with Glycol

Completion date

March 2011

Treatment

Aerated lagoons, partial and
complete mix zones and
subsurface horizontal flow
wetland system with FBA™

Need

Mayfield Farm Treatment Works, commissioned in 2001 was designed to treat run off from Heathrow Airport's Southern Catchment. The run off is contaminated with glycols resulting from the airports de-icing operations. Treating glycol contaminated run off is a challenge at every airport faced with varying cold-climate winter conditions. The run off can contain over 20,000 mg COD/L at 1°C. The original system consisted of balancing ponds, aeration lagoons, rafted reed beds and 12 horizontal subsurface flow reed beds covering 2.08 hectares. Designed to treat influent COD at 170 mg/l with a design flow of 40l/s, the wetland cells consisted of open water zones and gravel zones and were planted with *Phragmites australis*. The original system operated passively with oxygen transfer rate of 2.4 – 7.7 g/m³/d, removing 4 – 13 g/m³/d of COD. This system was unable to treat current volumes of effluent and was failing to achieve compliance.



Solution

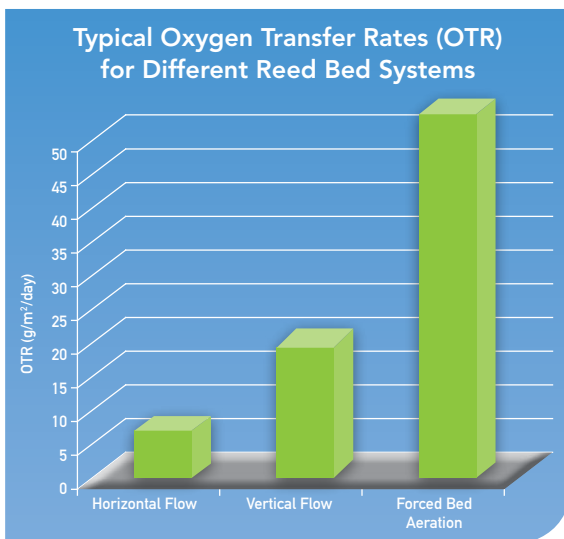
ARM conducted a full scale trial comparing the existing reed bed design with a reengineered reed bed and one fitted with Forced Bed Aeration™ (FBA™). The results indicated that there is enough wetland volume at Heathrow, but the limited oxygen transfer rate is limiting treatment performance.





ARM reengineered the distribution and collection system and retrofitted FBA™ into the existing reed beds. The open water zones were filled with gravel and the gravel depth increased by 500mm. The upgrade works at the Mayfield Farm included the addition/modification of:

- Primary Reservoir Aeration + nutrient dosing point
- Complete aerated mix zone + nutrient dosing
- Partial aerated mix zone
- Balancing Pond aeration and nutrient dosing points



- Horizontal subsurface flow reed beds with FBA™
- Variable Speed Transfers
- Primary Treatment bypass facility (motorised shut-off valve)

The upgraded reed beds transfer up to 165 g/m³/d of oxygen and is now capable of treating 3500kg/BOD/day at 40l/s average flow.

Benefits

ARM delivered a cost-effective treatment upgrade with increased system capacity and operational flexibility. System optimization minimized life cycle costs for BAA.