



# Sludge Treatment

Sludge Treatment Reed Beds eliminate sludge transport costs and their impact on the environment is minimal compared to alternative treatment methods.



Sludge treatment reed beds (STRBs) have been used for the dewatering of sludge from wastewater treatment plants in Europe since 1988. Working in collaboration with Orbicon, ARM has introduced STRBs into the UK.

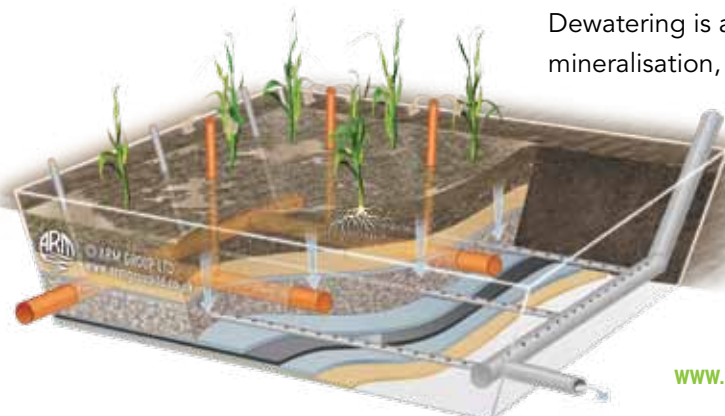
Dewatering occurs as a result of draining, evaporation, evapotranspiration and organics reduction (mineralisation). These systems are used on sites treating flows of up to 22,500 m<sup>3</sup>/day. The treatment systems consist of a minimum of eight individual lined reed bed basins which are 2.0 – 2.5m deep. Sludge, with dry solids content of 0.5 – 5%, is pumped in sequence to each basin to a pre-determined fixed solids loading. The sludge loadings amount to a maximum of 40 – 60 DS/m<sup>2</sup>/year dependent on the characteristics of the sludge. The sludge

residue will, after approximately ten years of operation, reach a height of 1.20 – 1.50 meters with a dry solids content of 30 – 40%.

The establishment and operation of STRBs systems is seen as having a lower impact on the environment compared to the alternative mechanical sludge dewatering systems which require the use of chemicals, incinerators, transport and disposal. Experience has shown that the quality of the final product with respect to pathogen removal and mineralisation of hazardous organic compounds after treatment make it possible to recycle the biosolids to agriculture as an Enhanced Treated Product.

## Effective reduction of sludge residue

Dewatering is achieved through mineralisation, which removes up to 25% of the organic matter in the sludge, drainage, evaporation and evapotranspiration.





### No chemicals needed

STRBs use no chemicals to treat sludge, reducing potential health and safety issues in the working environment, along with a reduction of the chemical residue in the treated wastewater.

### Energy savings

STRBs utilise naturally occurring microbial fauna to reduce and treat sludge. The only appreciable power consumption is by the use of transfer pumps between the wastewater treatment plant and the STRB and by ejectors in the sludge buffer tanks.

### No odour problems

Mineralisation occurs through aerobic degradation so that an STRB system has no odour problems.

### Better CO<sub>2</sub> – balance

Compared to other dewatering methods, an STRB system has reduced CO<sub>2</sub> emissions.

### Improved sludge quality

The content of substances detrimental to the environment can be reduced to a degree that the sludge conforms to the limits for deposition on agricultural land. A six log reduction in infectious solids is seen in residue removed from the STRB.

### Good options for recycling

After treatment there are many options for recycling, including use as a fertiliser on agricultural land. Sludge quality is cleaner and better adapted to the natural cycle when put to agricultural use than mechanically dewatered sludge.

### Reduction of transport and spreading costs

An STRB system will more than halve

costs of transport and spreading, since the volume of sludge can be reduced to approx. 1/3 compared to mechanical dewatering.

### Greater treatment capacity in wastewater treatment plant

Experience has shown that 5 – 15% of wastewater treatment plant capacity is freed at no extra cost, based on improvement in the quality and purification of reject water compared to existing dewatering systems.



Comparison of Sludge Treatment Reed Bed System with mechanical dewatering plant (Kolding, Denmark 2000 tonne dry solids per annum)			
	AGRICULTURE	REED BED TREATMENT	CENTRAL DRYING / INCINERATION
<b>EMISSIONS</b>			
CO <sub>2</sub> (tonnes/Year)	157	37	335
NO <sub>x</sub> (Kg/Year)	735	235	200.000
SO <sub>2</sub> (Kg/Year)	~0	~0	10.000
<b>SMELL</b>			
Spreading on Crop Field	YES	NO	n/a
Container transport	YES	NO	YES
Ventilation outlet/smoke	YES	NO	YES
<b>TRAFFIC</b>			
Number of trucks	910	300	1010
<b>EXTERNAL NOISE</b>			
Ventilation + cars	Yes	No	Yes
Other Considerations	Spreading	Emptying	YES
<b>INTERNAL ENVIRONMENT</b>			
Chemical Risks	YES	NO	YES
Heavy Traffic	YES	NO	YES
Dangerous Machines	MEDIUM	FEW	MANY
Noise	MEDIUM	LOW	HIGH
<b>RESIDUAL SUBSTANCES</b>			
Pathogens	YES	NO	NO
Heavy Metals	Unchanged	Unchanged	Fluegas / ash
Hazardous compounds	Unchanged	Reduced	Ash residue

natural wastewater treatment