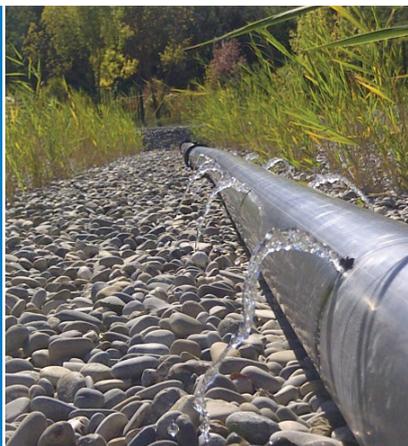




Phragmifiltre: Full sewage treatment by reed beds

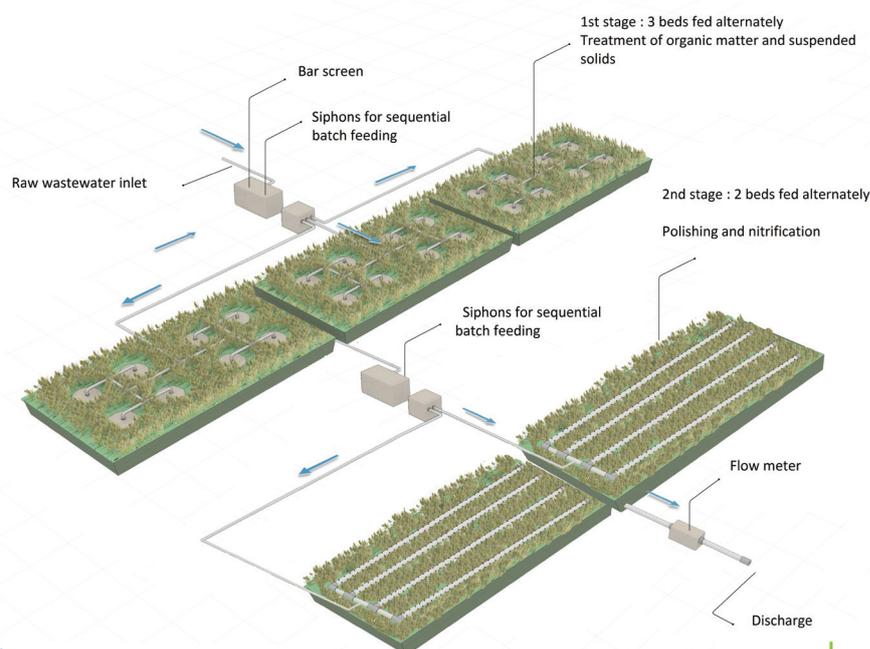
Phragmifiltre exemplifies the rapid evolution of reed bed technology over the past 20 years, from the initial tertiary treatment application to the full treatment of sewage wastewater.



From their first application as a tertiary treatment, 'final polish', solution through secondary treatment, including nitrification, reed bed wastewater treatment systems are now widely being used for the full treatment of sewage all over the globe through the application of the **Phragmifiltre** system.

The **Phragmifiltre** system comprises vertical flow constructed wetlands (reed beds) for the full treatment of sewage and has been successfully operating in

France through Epur Nature and SINT since the 1990's. To date there are over 800 **Phragmifiltre** systems treating raw sewage for loads from 20 to 5,000 PE (population Equivalents). The systems are typically designed to have two stages, the first with three beds, the second with two beds. The first stage filters out and dewateres the solids in the raw waste water on the surface of the bed. The filtrate passes down through the reed bed which acts as a typical batch flow vertical flow



natural wastewater treatment



www.armgroup Ltd.co.uk

t. +44 (0) 1889 583811



reed bed reducing BOD primarily but also undertaking nitrification of ammonia. The second stage vertical flow beds provide additional BOD reduction and completes

	INLET CONCENTRATION (MG/L)		OUTLET CONCENTRATION (MG/L)		REMOVAL EFFICIENCIES (%)	
	Mean	SD	Mean	SD	Mean	SD
COD	651	282	50	29	92	7
BOD5	291	140	8	9	97	3
SS	242	133	8	6	97	3
TKN	56	34	7	12	90	12
TP	7	4	6	3	32	25

nitrification of ammonia prior to discharge. Wastewater, preferably flowing by gravity, is fed to each bed in rotation thereby allowing all the beds to have a rest period. The use, where possible, of siphon technology for dosing both stages minimises, or eliminates, power requirements.

In the past the UK sewage treatment industry has tended to use constructed wetlands as a back stop, a means to cover for upstream process deterioration. The recent adoption of **Phragmifiltre** by a major UK Water Company signifies a major step change in thinking and indicates recognition of the TOTEX benefits.

Conventional sewage treatment works (STW) generate sludges which have to be taken from small rural works to larger STW for treatment. **Phragmifiltre** stores and composts sludge on site and therefore no tanker costs (opex) and no roadways (capex) are required. **Phragmifiltre** also provides wildlife habitats that conventional STW do not. Conventional STW are hazardous areas and can be



vulnerable to vandalism, they need security fencing around the whole site (capex).

Phragmifiltre only requires security fencing around a few chambers. Conventional STW require weekly operator visits,

Phragmifiltre require monthly visits (opex).

Phragmifiltre constructed wetlands are an ideal replacement for aging STW and an environmentally attractive, low totex option for new developments. Typical treatment performance data from 70 plants is given in the table above.

There is potential for this technology to be aligned with other intensive reed bed treatment technologies such as Forced Bed Aeration™ to enhance treatment capabilities further if required.

- Full primary, secondary and tertiary sewage treatment by reed beds.
- Proven robustness with high tolerance of temporary hydraulic overloading.
- Low to zero energy consumption
- Integrated sludge treatment, therefore no tankering and associated access features required.
- Simple operation
- Low cost operation
- Excellent integration into the landscape and no nuisance such as odours or noise.

ARM Ltd in association with **Epur Nature** and **SINT** in France are proud to be bringing this technology to the UK and happy to supply further information on request.

natural wastewater treatment