

# EUROPEAN WASTE WATER MANAGEMENT CONFERENCE & EXHIBITION

16-17<sup>th</sup> July 2019,

The Hilton Birmingham Metropole, NEC

Tuesday 16<sup>th</sup> July

ROOM 1 – PRINCES

Conference Opening & Plenary

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Chair – Dr David Tompkins, Head of Knowledge Exchange & Innovation, Aqua Enviro

9.30 – 9.35 Conference Opening & Welcome

9.35 – 10.10 Plenary

Nitrogen and Phosphorus Removal

sponsored by



Chair – Rowland Minall, Operations' Director, Aqua Enviro

10.15 – 10.40 **Achieving UK's lowest phosphorus levels in Southern Water**

Jarvis, S.<sup>1</sup>, Lea, G.<sup>1</sup>, Sandalls, C.<sup>1</sup>, Cooper, P.<sup>2</sup>, <sup>1</sup>Southern Water, UK, <sup>2</sup>Veolia Water Technologies, UK

10.40 – 11.05 **Blended high performance coagulant for phosphorus removal at primary stage**

Gerardo, M., Gaskin, L. and Sullivan, M., Dwr Cymru Welsh Water, UK

11.05 – 11.35 **Coffee Break**

11.35 – 12.00 **The implementation of the CoMag process to lower the Phosphate discharge at Severn Trent (Finham WWTW)**

Goodwin, J.<sup>1</sup>, Zsirai, R.<sup>1</sup>, Green, R.<sup>2</sup>, <sup>1</sup>Evoqua Water Technologies, UK, <sup>2</sup>Costain, UK

12.00 – 12.25 **Introducing Bluewater Bio's FilterClear Process to Severn Trent Water's phosphorus removal strategy delivered by MMB**

Huo, C.<sup>1</sup>, Vale, S.<sup>2</sup> and Wohling, A.<sup>3</sup>, <sup>1</sup>Bluewater Bio, UK, <sup>2</sup>Severn Trent Water, UK, <sup>3</sup>Mott MacDonald Bentley, UK

12.25 – 12.50 **Initial commissioning experiences of meeting lower ammonia and total phosphorus permits**

Longhurst, C.<sup>1</sup>, Baloch, I.<sup>2</sup> and Jarvis, S.<sup>2</sup>, <sup>1</sup>Costain, UK, <sup>2</sup>Southern Water, UK



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**12.50 – 13.15 MABR as a low-energy compact solution for nutrient removal upgrades – results from a demonstration in the UK**  
Sunner, N.<sup>1</sup>, Peeters, J.<sup>2</sup>, Long, Z.<sup>2</sup>, Houweling, D.<sup>2</sup> and Martin, I.<sup>2</sup>, <sup>1</sup>Stantec, UK, <sup>2</sup>SUEZ Water Technologies & Solutions

**13.15 – 14.15 Networking Lunch – including poster session 13.30 – 14.00**

**Chair – Duncan Wildgoose, Business Development Director, FLI Water**

**14.15 – 14.40 Tertiary treatment of municipal wastewater at low temperature: comparing biocatalyst and nitrifying sand filters**  
Bobbio, J.<sup>1</sup>, Martin, B.<sup>1</sup>, Germain-Cripps, E.<sup>1</sup> and Nair, A.<sup>2</sup>, <sup>1</sup>Thames Water Utilities, UK, <sup>2</sup>Microvi Biotech Inc., USA

**14.40 – 15.05 Experience of Total Nitrogen removal in Southern Water**  
Baloch, I.<sup>1</sup>, Till, D.<sup>1</sup>, Jarvis, S.<sup>1</sup> and Liang, S.<sup>2</sup>, <sup>1</sup>Southern Water, UK, <sup>2</sup>Stantec, UK

**15.05 – 15.30 The challenges of Total Nitrogen removal**  
Banfield, P.<sup>1</sup> Anderson, M.<sup>1</sup> and Butterfield, M.<sup>2</sup>, <sup>1</sup>Veolia, UK, <sup>2</sup>Hach, UK

**15.30 – 16.00 Coffee Break**

**Chair – Michael Moe, Sales Manager, WesTech**

**16.00 -16.25 Validating the design and performance of the 4,500 m<sup>2</sup>/m<sup>3</sup> HiSA MBBR solution to meet regulatory consents on ammonia < 1 mg/l**  
Bass, K., FLI Water, UK

**16.25 – 16.50 Going for the one! Upgrading an ASP to achieve low ammonia concentrations**  
O’Brien, L.<sup>1</sup>, Cooper-Smith, G.<sup>1</sup>, Hughes, P.<sup>2</sup> and Wohling, A.<sup>2</sup>, <sup>1</sup>Eliquo-Hydrok, UK, <sup>2</sup>Mott MacDonald Bentley, UK

**16.50 – 17.15 Integrated approaches to phosphorus management in the Watton Brook**  
Knightbridge, J.<sup>1</sup> and Edevane, J.<sup>2</sup>, <sup>1</sup>Mott MacDonald, <sup>2</sup>Anglian Water, UK

## **ROOM 2 – LIBRARY (London & Cambridge)**

### **Emerging Contaminants**

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**Chair – Arthur Thornton, Associate Director, Atkins Global**

**10.15 – 10.40 Targeted treatment of antibiotics and other pharmaceutical residues with Arvia’s Nyex™ treatment process, to support the prevention of Antimicrobial Resistance (AMR)**  
Marjan, A. and Jeffrey, R, Arvia Technology Ltd, UK

**10.40 – 11.05 The removal of pharmaceuticals from hospital wastewater and municipal wastewater effluent using ozonation**  
Van den Eijnde, T.<sup>1</sup>, Boelee, N.C.<sup>1</sup>, Bates, P.<sup>2</sup>, Gray, J.<sup>2</sup>, <sup>1</sup>Nijhuis Water Technology, The Netherlands, <sup>2</sup>Nijhuis Industries UK & Ireland, UK



- 11.05 – 11.35 Coffee Break**
- 11.35 – 12.00 eXeno™: new operational strategy of MBBR to remove pharmaceuticals in municipal WWTP effluents**  
Torresi, E.<sup>1</sup>, Jeal, W.<sup>2</sup>, Sund, C.<sup>3</sup>, Anderson, H.R.<sup>4</sup>, Tang, K.<sup>4</sup>, Nussbaum, B.<sup>1</sup>, Gade Anderson, H.<sup>3</sup> and Christensson, M.<sup>1</sup>, <sup>1</sup>Veolia Water Technologies, Sweden, <sup>2</sup>Veolia Water Technologies, UK, <sup>3</sup>Krøger A / S, Denmark, <sup>4</sup>Technical University of Denmark
- 12.00 – 12.25 C-ION non-thermal plasma oxidative degradation of pharmaceuticals as fourth treatment step of wastewater treatment plants**  
Rupprich, M.<sup>1</sup>, Obholzer, T.<sup>2</sup>, Winkler, K.<sup>2</sup>, Jabornig, S.<sup>2</sup> and Hazard, B.<sup>3</sup>, <sup>1</sup>MCI Management Center Innsbruck, Austria, <sup>2</sup>SFC Umwelttechnik GmbH, Austria, <sup>3</sup>Trant Engineering Ltd, UK
- 12.25 – 12.50 A ligno-cellulosic bio-adsorbent derived from sawdust waste for the removal of meropenem antibiotic dissolved in water**  
Tretsiakova-McNally, S., Solan, B., Currie, R., Akinsanmi, O., Arnscheidt, J., McDermott, R. and Coleman, H., Ulster University
- 12.50 – 13.15 Antimicrobial resistance in our sewage: challenges and opportunities**  
Hayhurst, E., Redhead, S. and Nieuwland, J., The University of South Wales, UK
- 13.15 – 14.15 Networking Lunch – including poster session 13.30 – 14.00**

**Panel Discussion: Microplastics in Wastewater: Responsibilities and Challenges**

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**Chair – Steve Bungay, Technical Director, Helix Environmental Consultancy**

- 14.15 – 15.30** Paul Linwood, Wastewater Policy Manager, Southern Water  
Alice Horton, Ecotoxicologist, Centre for Ecology and Hydrology  
Thomas Stanton, PhD Researcher, University of Nottingham

**15.30 – 16.00 Coffee Break**

**AMP 7 Challenges**

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**Chair – Martin Jolly, Associate Business Development Director, Aqua Enviro**

- 16.00 – 16.25 The requirements and challenges associated with the AMP7 Pass Forward Flow Compliance Drivers**  
Gallagher, M., United Utilities
- 16.25 – 16.50 AMP7 capital delivery challenges for the water industry**  
Sunner, N., Stantec (UK) Ltd, UK
- 16.50 – 17.15 The role of the water industry in supporting sustainable economic growth for an advanced economy and the need for the water sector to maximise circular economy measures to minimise cost increases**  
Palmer, S., Stantec (UK) Ltd, UK



## ROOM 3 - ARDEN

### Process Modelling and Design

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**Chair – Paul Curtis, Senior Design Manager, Anglian Water @one Alliance**

- 10.15 – 10.40**    **Development of a novel effluent aeration project at Mogden STW based on a water quality model for the Upper Thames Tideway**  
Lodge, B., and Spooner, S., Atkins, UK
- 10.40 – 11.05**    **Model-based assessment of the plant: using control to optimize existing aeration capacity to meet future effluent limits**  
Dold, P.<sup>1</sup>, Brian, K.<sup>1</sup>, Conidi, D.<sup>1</sup>, Jarvis, S.<sup>2</sup> and Nikolova-Kuscu, R.<sup>2</sup>, <sup>1</sup>EnviroSim Associates, USA, <sup>2</sup>Thames Water, UK
- 11.05 – 11.35**    **Coffee Break**
- 11.35 – 12.00**    **Successful delivery of innovative design solutions through optimisation and process modelling**  
Lewin, I.<sup>1</sup> and Mansucial, A.<sup>2</sup>, <sup>1</sup>Stantec (UK) Ltd, <sup>2</sup>MWH Treatment, UK
- 12.00 – 12.25**    **Enhanced process models for final settlement tanks**  
Burt, D.<sup>1</sup>, Wimshurst, A.<sup>1</sup>, Jarvis, S.<sup>2</sup>, <sup>1</sup>Frazer-Nash Consultancy Ltd, <sup>2</sup>Thames Water, UK
- 12.25 – 12.50**    **Novel and efficient design of hydraulic drop structures for large sewers and flood relief schemes**  
Jarman, D. and Barter, P., Hydro International, UK
- 12.50 – 13.15**    **Computer modelling of the Nereda<sup>®</sup> Aerobic Granular Sludge process using commercially available models**  
Oliver, B., Robertson, S.<sup>1</sup>, van Bentem, A.<sup>2</sup>, van Opijnen, J.<sup>2</sup>, <sup>1</sup>Royal HaskoningDHV, UK, <sup>2</sup>Royal HaskoningDHV, Netherlands
- 13.15 – 14.15**    **Networking Lunch – including poster session 13.30 – 14.00**

### Process Control and Optimisation

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**Chair – Isabelle Lewin, Principal Process Engineer, Stantec**

- 14.15 – 14.40**    **Utilizing integrated software, proven algorithms and decades of chemical applications experience to continuously optimize chemical usage and meet effluent Phosphorus permit compliance levels for major Utilities in the UK**  
Abinet, R., Kemira Chemicals Germany, GmbH, Germany
- 14.40 – 15.05**    **Experiences with an improved PID-controller for nitrogen removal**  
Charatjan, M.<sup>1</sup>, Binder, R.<sup>1</sup> and Cakir, C.<sup>2</sup>, <sup>1</sup>Binder GmbH, Germany, <sup>2</sup>MCC Process Technology Ltd, UK



**15.05 – 15.30**    **A systems thinking approach to asset optimization – Improving the real-time operation of sewage systems and wastewater treatment plants to improve and stabilize performance, reduce OPEX and deliver low-build solutions**  
Önnerth, T.<sup>1</sup>, Stentoft, P.A.<sup>1</sup>, Jeal, W.<sup>2</sup>, <sup>1</sup>Krüger-Veolia Water Technologies, Denmark, <sup>2</sup>Veolia Water Technologies, UK

**15.30 – 16.00**    **Coffee Break**

#### ROOM 4 - OXFORD

#### Constructed Wetland Association Annual Conference Wastewater Management and Beyond .....



**10.15 – 10.40**    **Keynote Speaker: Dr. Fabio Masi, Iridia**  
Dr Masi will give an Illustrated overview of the multiple benefits of constructed wetland projects around the world, including some historical perspectives

**10.40 – 11.05**    **Two stage vertical flow constructed wetlands' performance and maturing in temperate climate**  
Khomenko, O.<sup>1</sup>, Blanco, I.<sup>2</sup>, Cook, A.<sup>2</sup>, Cunliffe, D.<sup>2</sup>, Dotro, G.<sup>1</sup>, Jefferson, B.<sup>1</sup>, Coulon F.<sup>1</sup>, Jordan, T.<sup>2</sup>, Shepherd, R.<sup>2</sup>, Smith, R.<sup>2</sup>, and Bajón Fernández, Y<sup>1\*</sup>.  
<sup>1</sup>Cranfield University, UK, <sup>2</sup>Severn Trent Water, Coventry, UK

**11.05 – 11.35**    **Coffee Break**

**11.35 – 12.30**    **Workshop**  
An introduction to constructed wetland technologies, and then an interactive session relating to the site visits of the afternoon.

**12.30 – 13.00**    **Networking Lunch – including poster session**

**13.00 – 17.15**    **Site Visit (*must be pre-booked*)**

Site visits will include visits to Severn Trent Water's Hulland Ward and Corley Wastewater Treatment works.

## Wednesday 17<sup>th</sup> July

### ROOM 1 - PRINCES

#### Plenary

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##### Chair – TBC

**9.00 – 9.40**      **Research and Innovation – Looking ahead**  
Steve Kaye, CEO, UKWIR

##### Panel Discussion: AMP 7 Challenges

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##### Chair – Natasha Wiseman, Founder and Chief Executive, WiseOnWater

**9.45 – 11.00**      **Alison Fergusson**, Associate Director, OFWAT  
**Mark Craig**, Senior Analyst, Strategic Asset Planning, Strategy and Regulation,  
Severn Trent Water  
**Narinder Sunner**, Technical Lead – Wastewater Non-Infrastructure, Stantec

**11.00 – 11.30**      **Coffee Break**

#### Biological Phosphorus Removal

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##### Chair – Rosemary Barker, Process Design Engineering Lead, Severn Trent Water

**11.30 – 11.55**      **Evolving world of biological phosphorus removal for treating wastewater:  
science and application**  
Umble, A., Stantec, USA

**11.55 – 12.20**      **Enhanced biological phosphorous removal with C-TECH technology applying an  
optimised anaerobic plug-flow selector**  
Jabornig, S.<sup>1</sup>, Wutscher, K.<sup>1</sup>, Brandstätter, R.<sup>1</sup> and Hazard, B.<sup>2</sup>, <sup>1</sup>SFC  
Umwelttechnik GmbH, Austria, <sup>2</sup>Trant Engineering Ltd, UK

**12.20 – 12.45**      **A more rigorous aeration design of biological nutrient removal plants**  
Plano, S., Alford, H. and Giuffre, G, Stantec (UK) Ltd, UK

**12.45 – 13.10**      **25 years of enhanced biological phosphorus removal - The Severn Trent story**  
Barker, R., Vale, P., Wickens, D., Luck, R. and Richards, A., Severn Trent Water,  
UK

**13.10 – 14.10**      **Networking Lunch – including poster session 13.30 – 14.00**

##### Chair – Peter Dold, President, Envirosim

**14.10 – 14.35**      **Flexible configuration Bio-P: The road to Uttoxeter**  
Wickens, D., Jordan, T., Wilson, M. and Richards, A., Severn Trent Water, UK



- 14.35 – 15.00**    **Practical laboratory tests & sampling studies to calibrate process models: achieving Biological Phosphorus Removal**  
Kabir, M., Smyth, M. and Wallis, J., Aqua Enviro, UK
- 15.00 – 15.25**    **New generation of MBBR for biological treatment of carbon, nitrogen and phosphorus**  
Humbert, H.,<sup>1</sup> Lemaire, R.<sup>1</sup>, Germain, T.<sup>2</sup>, Scherpereel, G.<sup>2</sup>, Bigot, B.<sup>3</sup>, <sup>1</sup>Veolia Technical & Performance Department, France <sup>2</sup>Veolia Research & Innovation, France, <sup>3</sup>Veolia Water & Technologies UK
- 15.25 – 15.50**    **The potential for Bio-P Removal; how low can you go?**  
Alford, H.<sup>1</sup>, Jeavons, J.<sup>1</sup>, Plano, S.<sup>1</sup> and Blanco, I.<sup>2</sup>, Stantec (UK) Ltd, Severn Trent Water, UK
- 15.50 – 16.00**    **Poster Award & Conference Close**  
Martin Jolly, Associate Business Development Director, Aqua Enviro

## ROOM 2 - LIBRARY

### Workshop - Frontiers in Engineering Biology: New Paradigms for the Water Industry Hosted by Newcastle University

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- 9.45 – 11.00**    Join this workshop to learn about a multi-scale modelling strategy developed by Newcastle University that allows the properties of individual bacteria in a floc, biofilm or granule at the micrometre scale to be applied at the metre scale. This powerful approach represents a radical departure from classical modelling techniques such as ASM1 or ADM 1 because it allows the biological and mechanical properties of cells from different groups or species to be translated into macroscale models.

This opens the door to the extremely rapid testing of biological treatment processes at low cost – significantly reducing the development costs of new technologies. The modelling platform can incorporate differing and competing metabolisms and mechanics. The nature and properties of these metabolisms can be linked to genome level information garnered by the new generation metagenomic tools.

- 11.00 – 11.30**    **Coffee Break**

## Innovation

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### Chair – Steve Kaye, CEO, UKWIR

- 11.30 – 11.55**    **Spidflow™ for wastewater treatment: high rate clarification without chemicals**  
Vigneron-Larosa, N.<sup>1</sup>, Pizzagalli, S.<sup>1</sup> and Gaid, K.<sup>1</sup> and Bigot, B.<sup>3</sup>, <sup>1</sup>Veolia, France, <sup>2</sup>Veolia Water Technologies, Italy, <sup>3</sup>Veolia Water Technologies, UK
- 11.55 – 12.20**    **Diverse examples of HYBACS upgrades**  
Biddle, J., Bluewater Bio, UK
- 12.20 – 12.45**    **High efficiency MBBR and the unique media clarifier**





McAteer, J., Aqwise, UK

**12.45 – 13.10 Enzymatic hydrolysis of fine sieved materials from wastewater for the production of carbon source at Amsterdam Schiphol Airport wwtp – towards CO<sub>2</sub> neutral operations**

van den Brink, P., Scherrenberg, S.M., Al-Zuhairy, S. and Whelan, D., Evides Industriewater, The Netherlands

**13.10 – 14.10 Networking Lunch – including poster session 13.30 – 14.00**

**Chair – Pete Vale, Technical Lead - Innovation, Severn Trent Water**

**14.10 – 14.35 The fundamental biophysical relationships prevalent in municipal wastewater treatment biotreatment systems and how to use the knowledge to optimise treatment operations**

Palmer, S.<sup>1</sup>, Noone, G.<sup>2</sup> and Hoyland, G.<sup>3</sup>, <sup>1</sup>Stantec (UK) Ltd, <sup>2</sup>Newcastle University, UK, <sup>3</sup>Bluewater Bio, UK

**14.35 – 15.00 Phosphorus and ammonia removal and recovery through ion exchange (IEX) process at demonstration scale**

Guida, S.<sup>1</sup>, Rubertelli, G.<sup>2</sup>, Jefferson, B.<sup>1</sup> and Soares, A.<sup>1</sup>, <sup>1</sup>Cranfield University, UK, <sup>2</sup>University of Bologna, Italy

**15.00 – 15.25 Full scale membrane aerated biofilm reactor plant performs nutrients removal without internal circulation**

Laderman, R. and Schechter, R., Fluence Corporation, Israel

**15.25 – 15.50 Microalgae-based wastewater treatment: valorisation of accumulated microalgal biomass**

Novoveska, L., Winter, J., Ho, F. and Murray, D., Industrial Phycology

### ROOM 3 - ARDEN

**Constructed Wetland Association Annual Conference  
Wastewater Management and Beyond .....**



**Chair – Geoff Sweeney, Chair of the CWA, and Director, Wetland Engineering**

**10.00 – 10.10 Chairman's opening**

**10.10 – 10.35 The Ingoldisthorpe Wetland one year on; nature, community and waste-water treatment**

Tosney, J., Norfolk Rivers Trust, UK

**10.35 – 11.00 Mires on the Wyre; Wetlands and the Catchment Based Approach. *How collaboration between the NGO's, Local Authorities, Regulators and Landowners can lead to effective delivery in both urban and rural environments***





Myerscough, T.<sup>1</sup>, Sweaney, G.<sup>2</sup> and Green, C.<sup>3</sup>, <sup>1</sup>Wyre Rivers Trust, UK, <sup>2</sup>Wetland Engineering, UK, <sup>3</sup>Wyre Council, UK

- 11.00 – 11.30 Coffee Break**
- 11.30 - 11.55 The health and wellbeing benefits of access to Green Infrastructure**  
Naismith, D., WWT Consulting, UK
- 11.55 – 12.20 Role of design and operational factors in the removal of pharmaceuticals by constructed wetlands**  
Ilyas, H.<sup>1\*</sup>, Masih, I.<sup>1,2</sup>, van Hullebusch, E.D.<sup>3</sup>, <sup>1</sup>Water Treatment and Management Consultancy, The Netherlands, <sup>2</sup>IHE Delft, Institute for Water Education, The Netherlands, <sup>3</sup>Institut de Physique du Globe de Paris, Sorbonne Paris Cité, Université Paris Diderot, France
- 12.20 – 12.45 An innovative constructed wetland system to treat edible oil refinery wastewater**  
Ragen, A.K.<sup>1</sup>, Musruck, R.<sup>2</sup> and Nurmahomed, N.<sup>1</sup>, <sup>1</sup>University of Mauritius, <sup>2</sup>MOROIL Ltd, Mauritius
- 12.45 – 13.10 Understanding the impact of vertical flow constructed wetlands sludge layer properties on its permeability**  
Khomenko, O., Dotro, G., Jefferson, B., Coulon F., and Bajón Fernández, Y., Cranfield University, UK
- 13.10 – 14.10 Networking Lunch – including poster session 13.30 – 14.00**
- 14.10 – 14.35 Rural Sustainable Drainage Systems : Experience on Ayrshire Farms so Far**  
Moir, S.E., Moir Environmental Ltd, UK
- 14.35 – 15.00 Willow constructed wetlands for wastewater treatment and bio-mass generation**  
Avery, L.M.<sup>1</sup>, Beeseley, L.<sup>1</sup>, Stockan, J.<sup>1</sup>, Abel, C.<sup>1</sup>, Tamburini, M.<sup>1</sup>, Randerson, P.<sup>2</sup> and Hough, R.<sup>1</sup>, <sup>1</sup>James Hutton Institute, UK, <sup>2</sup>Cardiff School of Biosciences, UK
- 15.00 – 15.25 Constructed wetlands in the urban landscape / achieving wetland ecosystems services where space is limited**  
Fulford, G., Biomatrix Water Solutions, UK
- 15.25 – 15.50 Treatment of rural Agri-food production process water using low energy aerated wetland**  
Freeman, A.<sup>1</sup>, Hawes, P.<sup>1</sup>, Mathews, M.<sup>2</sup>, Cooper, D.<sup>1</sup>, <sup>1</sup>ARM Group Ltd, UK, <sup>2</sup>Peak Associates Environmental Consultants Ltd, UK

#### EWWM Posters

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##### Hidden biological phosphorus removal

Gerardo, M. and Sullivan, M., Dwr Cymru Welsh Water, UK



**Decision support tool for the selection of technologies: resource recovery from wastewater**

Sucu, S.<sup>1</sup>, Ouelhadj, D.<sup>1</sup>, Martinson, B.<sup>1</sup>, Williams, J.<sup>1</sup> and van Schaik, M.<sup>2</sup> and Esmeli, R.<sup>1</sup>,

<sup>1</sup>University of Portsmouth, UK, <sup>2</sup>HZ University of Applied Science, Netherlands

**An evaluation of the wastewater treatment performance and hydraulic characteristics of submerged aerated filters**

Lawrence, A., WPL and University of Portsmouth, UK

**Thermal ammonia stripping as a means of ammoniacal nitrogen control**

Eden, R.<sup>1</sup>, Richardson, K.<sup>1</sup> and Thomas, T.<sup>2</sup>, <sup>1</sup>Organics Ltd, UK, <sup>2</sup>University of Warwick, UK

**Tackling Antimicrobial Resistance: Adsorption of meropenem and ciprofloxacin on ligno-cellulosic substrate from sawdust**

Akinsanmi, O., Kaya, S., Tretsiakova-McNally, S., Arnscheidt, J. and Coleman, H., Ulster University, UK

**Removal of contraceptive pill and HRT residues from water using ligno-cellulosic materials**

Coleman, H., O'Sullivan, H., Murphy, C., Akinsanmi, O., Arnscheidt, H. and Tretsiakova-McNally, S., Ulster University, UK

**Antimicrobial resistance in our sewage: challenges and opportunities**

Hayhurst, E., Redhead, S., Nieuwland, J., The University of South Wales, UK

**CWA Posters**

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**Sustainable project management approach - Deerplay reed bed refurbishment**

Pramekalan, M.<sup>1</sup>, Button, S.<sup>1</sup>, Hargreaves, A.<sup>1</sup>, Osborne, I.<sup>1</sup>, Sweaney, G.<sup>2</sup>, <sup>1</sup>Coal Authority, UK,

<sup>2</sup>Wetland Engineering, UK

**Role of design and operational factors in the removal of pharmaceuticals by constructed wetlands**

Ilyas, H.<sup>1\*</sup>, Masih, I.<sup>1,2</sup>, van Hullebusch, E.D.<sup>3</sup>, <sup>1</sup>Water Treatment and Management Consultancy, The Netherlands, <sup>2</sup>IHE Delft, Institute for Water Education, The Netherlands, <sup>3</sup>Institut de Physique du Globe de Paris, Sorbonne Paris Cité, Université Paris Diderot, France

**The use of a 1D hydraulic drainage model to aid the design of a 500ha constructed wetland**

Haw, R., Envireau Water

**Supporting Organisations**

