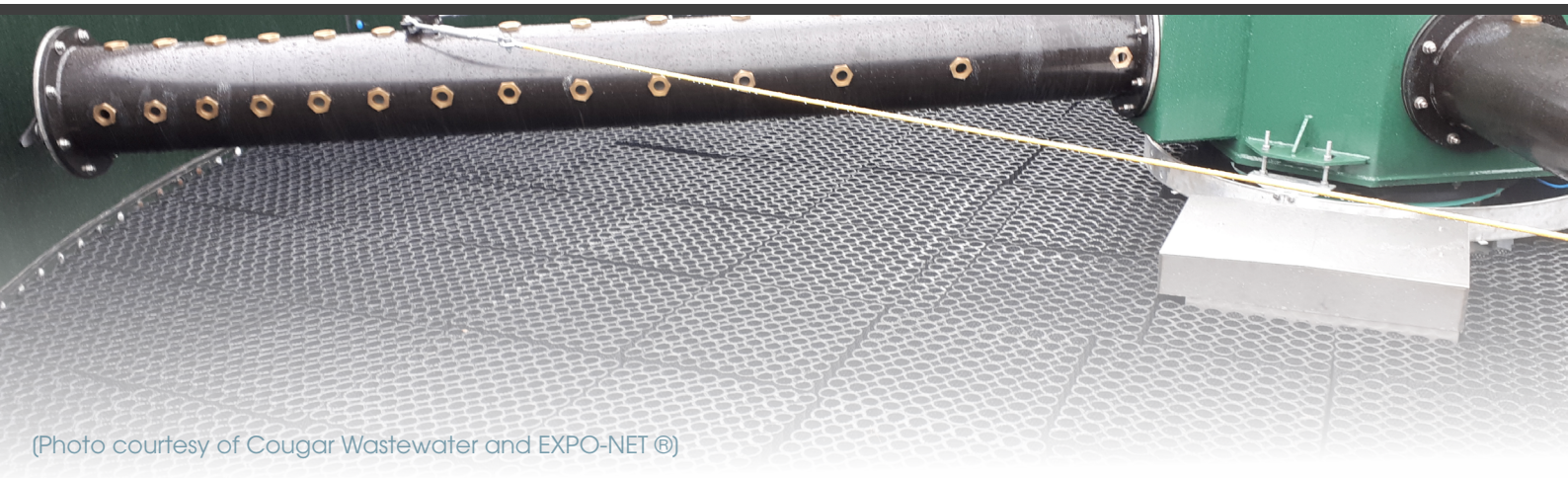
BIO-BLOK®

An EXPO-NET brand

For Sewage & Wastewater Treatment

Application Case Study

Sandbach Wastewater Treatment Works,
Cheshire, England



(Photo courtesy of Cougar Wastewater and EXPO-NET ®)

BIO-BLOK® Filter Media Improves Sandbach Wastewater Treatment Works Performance by 40% and Saves ~£0.5M

Alternative Biological Filter Media to Cross Flow

EXPO-NET works with Cougar Wastewater in the UK, to deliver alternative wastewater treatment filtration solutions with BIO-BLOK® for both new and existing works; the Sandbach site needed to increase capacity.

Flow and load calculations to expand the Sandbach Works filtration capacity were carried out by Cougar Wastewater using BIO-BLOK® fixed filter media instead of 60° plastic cross flow media, that historically had been specified for biological treatment of wastewater.

BIO-BLOK® enabled Cougar Wastewater to find a cost saving, higher performing solution that could not have been achieved for this project within the same space or original budget using a conventional cross flow media.

Sandbach Works Upgrade Overview

The Sandbach Wastewater Treatment Works in Cheshire is part of United Utilities Group plc. It provides sewage treatment and potable water for the North West of England. The Sandbach works needed to be upgraded to accommodate a 12.5% PE level (Population Equivalent) growth in the region.

The nitrifying filter (NTF) element part of this challenging project was designed by Cougar Wastewater in conjunction with Mott Macdonald Bentley (MMB), United Utilities Group and Ham Baker Adams; EXPO-NET's BIO-BLOK® 150 fixed filter media net cubes were specified. The project was delivered on time and within budget.

An overall project cost saving in the region of £500K was achieved using the BIO-BLOK® design, which was the only possible option achievable in the available asset footprint on the Sandbach site for the NTF units needed.

Sandbach Project BIO-BLOK®

Features & Benefits

- **A small enough tertiary stage NTF installation** to fit in the limited asset footprint on the existing site, as BIO-BLOK® net cubes need less than half the volume to deliver the same treatment as cross flow media.
- **40% reduction of overall project build time,** so significantly less plant down time; installation took only nine days per NFT filter, as BIO-BLOK® net tube filter cubes are strong, lightweight, and easy to stack by hand, combined with the overall asset being 50% smaller dimensionally using BIO-BLOK® as the filter media.
- **Self-cleaning operational benefit** due to BIO-BLOK® not needing flushing cycles.
- **Low maintenance costs** as there are no internal corrosion issues with the materials specified for the NTF filter system: BIO-BLOK® fixed media extruded from an inert plastic; outer enclosure is glass coated steel; the open mesh flooring support deck on the concrete piers made from glass fibre reinforced plastic (GRP).

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Sandbach Project NTF bio-tower under construction - The bottom layer of BIO-BLOK being installed inside a new Sandbach Works NTF bio-tower onto the GRP support deck mounted on concrete piers.

Key Project Cost Savings Using BIO-BLOK®

- Much lower overall asset build costs as smaller footprint possible with lower volume BIO-BLOK® filter media.
- Avoiding having to install an additional pump station on this installation.
- Operationally, the NTF unit has a much smaller tank, curtain distributor storm arm system and drive unit.

Fast & Easy Site Installation at Sandbach Works with BIO-BLOK®

Installation on site is fast and easy with BIO-BLOK® filter cubes, which are self-supporting, do not require a retention system and strong enough for installers to be able to stand on the cylindrical net tube ends; the rigid, strong polypropylene net tubes are welded together to make the BIO-BLOK® filter cubes needed.

Being so strong and rigid, each filter cube layer making up the bio-tower becomes a safe working installation platform to manually position the next filter media layer.

Being so lightweight, BIO-BLOK® cubes are easy to handle safely by hand and rapidly install manually without specialist lifting equipment.

BIO-BLOK® filter units for a project are constructed offsite, supplied as 'ready to install' filter cubes. Standard cubes are 55 x 55 x 55cm (made to order lengths from 45cm to 120cm), with 8 x 8 or 10 x 10 welded net tubes/cube, subject to the specification.

Technical Overview of BIO-BLOK® Filter Media Fixed Film Design & Superior Performance

- The unique open mesh helical design of BIO-BLOK® net tubes provides a biological filter media with a void percentage of 88%, 55mm diameter vertical clear passages, a vertical load bearing capability of ~4000kg/m^2, and a net weight of only 69kg/m^3.
- The cylindrical, open net configuration of BIO-BLOK® allow complete access to the active filter media surface area, which increases as the biofilm grows hence its superior filtration performance in use. The design configuration provides a much greater overall specific surface media area available, typically >70% more than using a conventional cross flow media. e.g. BIO-BLOK® 268 m^2/m^3 (1mm biomass) compared with 150m^2/m^3 for cross flow media, assuming complete access.
- BIO-BLOK® operates on a hydraulic surface loading ranging from 3m^3 p/m^2 p/hr to 10m^3 p/m^2 p/hr at a constant speed, hence is a very low maintenance fixed film filter, which is continually clean and well oxygenated.
- The two key water industry quality compliance parameters of maximum biochemical oxygen demand (BOD) and Ammoniacal Nitrogen content per litre for the final effluent after biological treatment are both exceeded by >45% with BIO-BLOK®.

"The Sandbach Wastewater Treatment Works NTF upgrade project is an excellent example of why we have been specifying BIO-BLOK® for more than 12 years. The technical performance achievable with BIO-BLOK® within a much smaller volume and footprint space simply cannot be achieved within the same space using a conventional cross flow media. Working with EXPO-NET and BIO-BLOK® has enabled Cougar Wastewater to find practical solutions that save installers and UK regional water authorities significant amounts of time and money."

- Andy Gostling, Partner, Cougar Wastewater

BIO-BLOK® is also used in other filtration, aquaculture and land drainage applications. Further information is available online at www.bio-blok.com . To find out more about the full range of extruded thermoplastic mesh products manufactured and supplied by EXPO-NET go to www.expo-net.com .

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