

CASE STUDY

CUSTOM-BUILT MODULAR

"PLUG & PLAY" WATER TREATMENT AT HS2: CONTAMINATED WATER REMEDIATION



The Envirogen contribution to HS2 marks a significant advancement in water treatment, efficiency, and innovation. Through strategic collaboration with Align JV, which includes several companies working on the HS2 project, such as Bouygues, Arthur McAlpine, and Volker Fitzpatrick, Envirogen successfully deployed a custom, modular 'plug and play' water treatment plant, achieving operational status within just six months.



SETTING NEW STANDARDS IN WATER TREATMENT

At the heart of this initiative was the development of a customised, modular plant capable of treating a feed flow of 420m³/hr of contaminated water for return to local water courses. This solution, with an output of 250m³/hr of treated water, incorporates pre-filtration, ultrafiltration membranes (UF), reverse osmosis (RO), and oxidative technologies, to meet the most rigorous environmental standards. It guaranteed that water returned to local watercourses was of unparalleled quality, showcasing Envirogen's commitment to excellence and sustainability.

The HS2 project has put its environmental responsibility at the forefront of the construction project and the replenishment of the water course with highly targeted water quality delivers a significant part of its environmental obligations.



BILL DENYER,
UK and European CEO at Envirogen Group:

"We are delighted to be working with Align JV on this HS2 project and employing our cutting-edge water technologies to support their commitment to environmental standards. Our teams have worked closely to create the process design in a short timeframe, demonstrating our market-leading approach to cost-effective problem solving in the sector. Our ability to provide lifecycle service support through remote monitoring and site presence, seeing the project through from cradle to grave, makes us an ideal partner for Align JV"

RAPID DEPLOYMENT

The partnership between Envirogen and Align JV, marked by strong synergy, highlighted efficient project execution from start to finish. Meticulous planning and robust project management empowered the team to flexibly meet HS2's specific needs. Designed for scalability and mobility, the plant's configuration permits swift adaptations to changing requirements, showcasing a forward-thinking approach to solving complex environmental challenges.

HS2, the largest infrastructure project in Europe, prioritises environmental responsibility. Envirogen's solution is a new water treatment plant designed to remediate contaminated process water from drilling activities and site runoff for discharge purposes.



CLICK TO WATCH VIDEO

<https://vimeo.com/822003828>

ADVANTAGES OF MODULAR-BLOCK PLANT SOLUTIONS FOR HS2

- **Robust and proven industrial water treatment technologies:** Pre-engineered solutions guarantee stringent quality and reliability, tailored to specific project needs with a low total cost of ownership, including:
 - **Pre-filtration:** Self-cleaning mechanical filters are installed to protect hollow fibre membranes from larger particles in the distribution analysis. These filters prevent the UF lumens from blocking and reduce the surface area available for production.
 - **Ultrafiltration membranes (UF):** Hollow fibre UF membranes provide sub-micron filtration to remove the remaining suspended solids content and reduce the turbidity loading presented to the RO system.
 - **Reverse osmosis (RO):** Semi-permeable RO membranes used for the rejection of unwanted dissolved salts and an overall reduction in conductivity values.
 - **Oxidative technologies:** Due to the outlet water having a very stringent threshold for the discharge of nitrite, the treatment scheme includes oxidative treatment to convert nitrite content to the less problematic nitrate state.
- **Fast build and delivery:** Modular mobile units pre-assembled and shipped to site allowed for straightforward integration, installation, and commissioning, significantly cutting project timelines.
- **Scalability and flexibility:** Multi-module design enabled units integrated and tailored to exacting needs, futureproofing the solution, and ensuring it remains adaptable to dynamic requirements.
- **Environmental benefits:** Combining best-in-class water treatment technologies guarantees water quality and energy savings, ensuring contaminated water is suitable for return to local watercourses.
- **Remote monitoring and support:** Digital control of modular units with remote water monitoring system and 24/7 engineering support enhances operational reliability and responsiveness.
- **Ease of removal and decommissioning:** Unlike conventional methods, modular plant can be easily dismantled after project completion, reducing the carbon footprint. This allows for efficient site restoration and reuse of assets in other projects, further enhancing sustainability efforts and highlighting environmentally responsible supply-chain practices.

LIFECYCLE SERVICE SUPPORT

Supporting this innovative technology is a comprehensive service delivery framework, ensuring the system's longevity and reliability. Envirogen's dedication to 24/7 support and maintenance, coupled with their remote monitoring capabilities, ensures that HS2 benefits from a sustainable and efficient water treatment solution.

KEY OUTCOMES

- The project took just 6 months from contract signing to treating a feed flow of 420m³/hr, with an output of 250m³/hr.
- Delivers remediation of wastewater to meet stringent environmental standards, ensuring replenishment of the water course with highly targeted water quality.
- Modular, future-proofed design for flexibility and scalability.
- Lifecycle service support with PureCare service, maintenance, and consumables plan.
- Multi-stakeholder engagement and specialist water treatment support provided throughout the project in collaboration with engineering consultancy groups.



ABOUT THE CLIENT

Align is a joint venture formed by three internationally recognised and privately-owned infrastructure companies: Bouygues Travaux Publics (a subsidiary of Bouygues Construction), Sir Robert McAlpine, and VolkerFitzpatrick (a subsidiary of VolkerWessels). Align leverages the extensive experience of these companies in delivering high-profile infrastructure projects both in the UK and globally, ensuring safe, timely, and budget-conscious completions.

In July 2017, Align was awarded the C1 package of the UK High Speed 2 (HS2) line. This package encompasses 21.6km of high-speed rail infrastructure set in a rural environment, including a 3.37km viaduct, 16.04km of twin-bored tunnels, and five vent shafts that facilitate both intervention and tunnel ventilation.

ABOUT ENVIROGEN

Envirogen is a leading international provider of water and wastewater treatment solutions. We solve complex challenges relating to water availability and quality, and help our customers to increase productivity, reduce costs and meet environmental and sustainability targets.

We do this through offering:

- Best in class water and wastewater treatment and process filtration technology
- Expertise in design, project management and engineering
- World class manufacturing and servicing capability



UK HEADQUARTERS

Envirogen Group
Unit 9, Wimsey Way, Alfreton Trading Estate
Alfreton, Derbyshire, DE55 4LS
T: +44 (0) 1773 441029
E: enquiries@envirogengroup.com

EUROPEAN HEADQUARTERS

Envirogen Technologies bv
Penningweg 71, 1507 DG Zaandam, The Netherlands
T: +31 75 204 7200
E: NLinfo@envirogengroup.com

NORTH AMERICAN HEADQUARTERS

Envirogen Technologies
2627 Chestnut Ridge Road, Suite 200
Kingwood, TX 7733
T: 713.979.9142
E: info@envirogen.com

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