

Great Badminton WRC

enhancing wastewater treatment efficiency and environmental compliance

by Galliford Try

Wessex Water

Great Badminton, a village in South Gloucestershire, England, is home to the Great Badminton Water Recycling Centre (WRC), a critical facility operated by Wessex Water. Serving the local village of Acton Turnville, the surrounding Badminton village, including the Badminton Estate, is home to the Duke & Duchess of Beaufort. The WRC plays a vital role in treating wastewater from local homes and businesses, ensuring that treated effluent is safely returned to the environment. To enhance site functionality and ensure compliance with modern environmental standards to monitor the exact flow pass forward to treatment, a comprehensive upgrade of the inlet works arrangement and flow monitoring was undertaken. This case study details the design, construction, and technological advancements implemented during the project.



Great Badminton WRC site overview - Courtesy of Galliford Try

Project background & drivers

The Great Badminton WRC is situated within the historic Badminton Estate, just off Allington Lane. The site sits on the grounds of Badminton House, the residence of the Duke of Beaufort, adding an additional layer of complexity to project planning and execution. The estate's historical significance necessitated a sensitive approach to construction, ensuring that the natural beauty and heritage of the surroundings were preserved.

The WRC does not have flow measurement and storm separation to U_MON4 standard, and the Wessex Water proposed to achieve this by implementing the D18253 Great Badminton WRC Advanced Mon 4 scheme.

The facility faced challenges due to aging infrastructure and the need to meet updated environmental regulations. Key drivers for the project included:

- **Regulatory compliance:** Ensuring adherence to updated discharge consents and environmental standards.
- **Operational efficiency:** Improving the reliability and control of wastewater treatment processes.
- **Continuous operation:** Maintaining full operational capacity throughout the upgrade to prevent service disruptions.
- **Heritage considerations:** Ensuring that construction activities did not interfere with the historic value of Badminton House and its grounds.
- **Civil enabling works:** Preparing the site for construction activities while minimising disruption to the existing infrastructure.
- **Programme control:** Managing project timelines effectively to ensure completion within the designated timeframe.
- **Client communication on FI plant:** Coordinating with the client on the Final Investment (FI) plant to align project goals and expectations.
- **Landowner engagement (Badminton Estate):** Working closely with the estate management to ensure smooth project execution while maintaining the integrity of the surrounding land.

Design & construction

The project, valued at £356,000 and spanning five months, was executed under the MEICA framework by Galliford Try in collaboration with Wessex Water.

The scope of work encompassed several critical upgrades:

- **Flow diversion:** Incoming flows from the Great Badminton Sewage Pumping Station were diverted to the inlet pumping station to optimise the treatment process and to ensure all flow entering the site could be monitored.
- **Flow measurement:** Two new MCERTS (Environment Agency's monitoring scheme for equipment) electromagnetic flow meters were installed on the inlet pumping station rising mains, to enable accurate monitoring of influent volumes, facilitating better process control and regulatory reporting.
- **Pump upgrades:** The existing inlet pumps were replaced with duty and duty assist pumps with variable-speed drives, allowing for precise control of flow rates to meet the permitted flow to full treatment requirements.
- **Storm return system:** Transitioning from a temporary storm return pump arrangement to a permanent installation involved integrating a guiderail mounted submersible pump and a robust ductile iron rising main.
- **Event Duration Monitoring (EDM) equipment:** A Pulsar ultrasonic transmitter was installed in the storm tank (MON1) and a Vega C-22 Radar Head was installed in the inlet pump station (MON3). These instruments provide Wessex Water control with alarms as to when and for how long the site enters storm conditions. Continued monitoring of this ensure compliance with the permitted flow to full treatment.
- **Motor control centre (MCC):** A new MCC housing the drives for the updated plant was installed within a glass reinforced plastic walk-in kiosk, enhancing operational reliability and safety.
- **Inlet works enhancement:** A static wave screen was installed on the inlet weir, accompanied by an access walkway, to improve debris removal and maintenance access.
- **Standby power:** A 60kVA standby generator from Addicott Electrics Ltd was installed, along with the construction of a delivery bund and mechanical bund interlock system to facilitate safe fuel deliveries, ensuring resilience during power outages.

Given the client's requirement for the site to remain fully operational during the works, meticulous planning and logical phasing were essential. The replacement of inlet pumps was carefully sequenced to ensure continuous functionality, minimising disruptions to the treatment process.

Great Badminton WRC: Supply chain - key participants

- **Principal contractor & M&E:** Galliford Try
- **Client designer:** SWECO
- **Civils contractor:** Onyx Civils
- **Metalwork:** Bryant's Southwest
- **MCC:** K Little Control Systems Ltd
- **Control panel kiosk:** Industrial GRP Ltd
- **Submersible pumps:** Xylem Water Solutions
- **Ductile iron pipework:** Saint Gobain PAM UK
- **Cross wave screen:** Jacopa Ltd
- **Emergency generator:** Addicott Electrics Ltd
- **EDM equipment:** Pulsar Measurement
- **EDM equipment:** Vega Controls Ltd
- **Trace heating & lagging:** Jade Insulation
- **Lifting davit:** Reid Lifting Ltd
- **Load testing:** Able Lifting Equipment (Southern) Ltd
- **Contaminated waste certification:** ACS Testing



Inlet pumping station - Courtesy of Galliford Try



Emergency generator from Addicott Electrics - Courtesy of Galliford Try



Fuel delivery bund interlock - Courtesy of Galliford Try



The MCC kiosk from Industrial GRP Ltd - Courtesy of Galliford Try



The new MCC from K Little Control Systems Ltd - Courtesy of Galliford Try

Innovations, cost savings & carbon reduction

The project incorporated several innovative approaches aimed at enhancing efficiency and sustainability:

- **Off-site fabrication:** Utilising off-site fabrication for components such as the glass reinforced plastic walk-in kiosk and pre-assembled pipework reduced on-site construction time and minimised environmental impact.
- **Renewable energy integration:** The on-site welfare unit was equipped with solar panels, significantly reducing reliance on diesel generators and lowering the project's carbon footprint.
- **Ecological considerations:** Prior to commencement, potential ecological concerns were addressed, including a thorough investigation into a suspected nesting area for great crested newts, a protected species. The area was confirmed unoccupied, ensuring that construction proceeded without disturbing local wildlife.

Challenges & solutions

The remote location of the site presented unique challenges:

- **Communication infrastructure:** Limited internet and phone signals were swiftly addressed by installing a fixed connection, ensuring smooth communication and project management.

- **Health & Safety:** Regular Health, Safety, and Environmental audits were conducted to ensure the site met the highest standards, creating a safe environment for all personnel.
- **Stakeholder engagement:** Strong relationships were built and maintained with estate management and the local shepherd, who oversees the surrounding grazing land, ensuring that project activities were minimally disruptive and aligned with the estate's operational needs.

Conclusion

The project successfully upgraded critical infrastructure, enhancing operational efficiency and ensuring compliance with modern environmental standards. The collaborative approach between Galliford Try, Wessex Water, and other stakeholders was instrumental in delivering the project within budget and on schedule, all while maintaining continuous site operations.

The integration of innovative solutions and a commitment to sustainability have positioned the facility to effectively serve the community's wastewater treatment needs for years to come. This project exemplifies effective engineering and strategic planning in the water industry, highlighting the importance of innovation and sustainability in modern infrastructure projects.

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