

Towcester WRC

addressing issues with storage capacity, flow capacity, phosphorus levels & growth requirements, to maintain the high standard that Anglian Water aspire to achieve

by Anglian Water's @one Alliance

Towcester Water Recycling Centre (WRC) is located in west Northamptonshire, and plays a vital role in supporting the environment of its surrounding catchment area. Located in a rapidly growing region, Towcester WRC supports the local community by treating wastewater before safely discharging it into nearby watercourses. However, as the area experiences ongoing urban and industrial growth, the demands on the WRC have increased significantly, necessitating upgrades to meet current and future obligations.



Towcester WRC activated sludge plant – Courtesy of Anglian Water's @one Alliance

The issues

In early AMP7, Anglian Water had noticed four main issues with the WRC which needed addressing. These included storage capacity, flow capacity, phosphorus levels and growth requirements, to maintain the high standard that Anglian Water aspire to achieve.

Flow-to-full treatment (FFT): With their being a new compliance requirement for FFT in place, this means higher treatment capacities to handle increased flow rates are necessary. The existing hydraulic and biological systems at Towcester WRC lacked the sufficient capacity to meet these new obligations, placing the site at risk of non-compliance. Failure to address this would result in environmental harm and regulatory penalties.

Growth element: Towcester WRC is experiencing a substantial rise in incoming wastewater loads, due to rapid population growth and urban expansion in the area. Current projections indicate that these additional loads will exceed the site's existing process capacity, leading to potential non-compliance and potential pollution risks.

Phosphorus removal: Under the Environmental Permitting Regulations (EPR) and AMP7 (Asset Management Period 7) obligations, Towcester WRC is required to significantly reduce the phosphorus discharge levels. Failure to comply with the

new phosphorus removal limits would not only contravene environmental standards but also compromise local water quality and biodiversity.

Storm management: Towcester WRC faces challenges in managing stormwater volumes during periods of heavy rainfall. To comply with the NEP FLOW driver UIMP6 and meet revised permits issued in AMP7, the site requires additional stormwater storage capacity. Insufficient storm tank volume could lead to overflows, adversely impacting nearby watercourses.

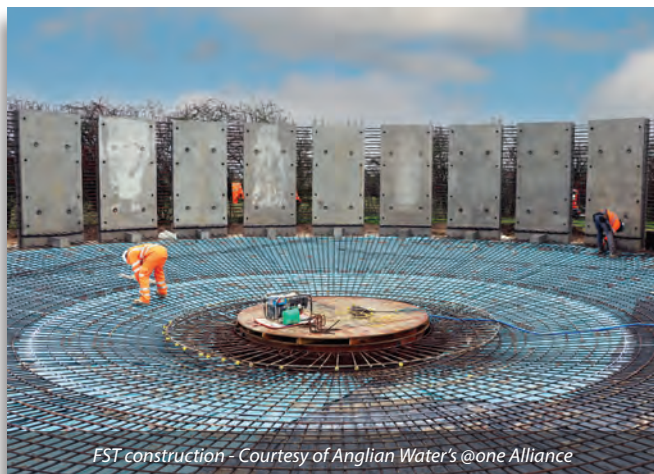
The solution phase

To address these challenges, Anglian Water's @one Alliance was tasked with providing a solution for Towcester WRC, leading to over £15m being invested to alleviate the potential future issues.

Flow-to-full treatment (FFT): To meet the increased FFT setting, additional treatment processes were installed downstream of the inlet works.

These upgrades include:

- A new activated sludge plant (ASP) which includes 10 above-ground tanks from Hayes GFS Ltd, equipped with



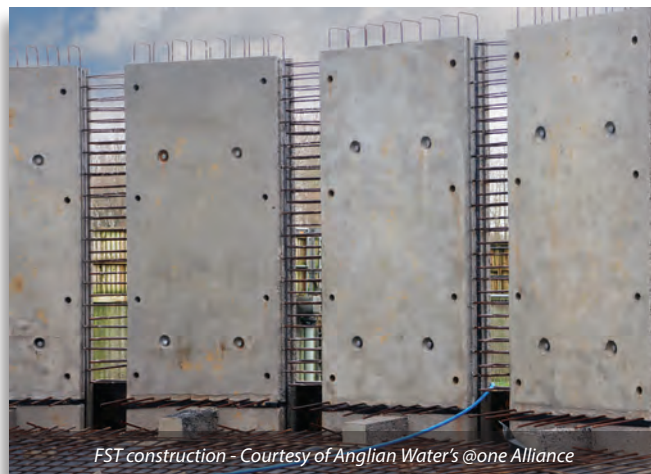
FST construction - Courtesy of Anglian Water's @one Alliance

Suprafil fine bubble diffused aeration systems to enhance biological treatment to provide a system capable of handling all site flows 97.3 l/s.

- An ASP feed pumping station designed to ensure efficient and reliable delivery of wastewater to the ASP.
- Two new part-buried final settlement tanks (FST) 17m in diameter, with scraper bridges to improve solids separation and sludge management.
- A new return activated sludge (RAS) pumps, to maintain effective recycling of activated sludge.

Growth element: The site's power has been enhanced and upgraded with a new transformer, a new 12m motor control centre (MCC) and low-voltage switchboard, ensuring sufficient power supply for the upgraded systems.

The existing on-site terminal pumping station (TPS) has been upgraded to allow for higher flow rates and better reliability from



FST construction - Courtesy of Anglian Water's @one Alliance

the pumps, and the installation of a new sludge thickener plant will help manage the new higher levels of sludge coming off the primary settlement and final settlement tanks.

Phosphorus removal: To meet the new phosphorus limits, the new ASP plant is being used in combination with a new ferric dosing system, comprising of new dosing pumps and an additional dosing point to enhance the chemical phosphorus removal.

For the final polish of the effluent, a new tertiary filter has been installed to aid the removal of any final solids.

Storm management: To prevent stormwater overflows and to comply with the new storm tank volume requirements, an above-ground storm tank from Hayes GFS Ltd has been installed.

This new tank is linked to the existing stormwater storage tanks and provides an additional 271m³ of storage.



The new final settlement tanks with scraper bridges - Courtesy of Anglian Water's @one Alliance

Benefits of the solution

The upgrades ensure Towcester WRC complies with all current regulatory requirements, including an enhanced FFT capacity to handle increased flow rates. With phosphorus levels reduced to below 0.3 mg/l, water quality and local aquatic ecosystems will be preserved, and by increasing stormwater storage, the risk of the occurrence of untreated overflows and potential pollution events will be reduced. The fine bubble aeration system and optimised MCC will improve energy efficiency, lowering operational costs due to the reduced level of maintenance required to ensure performance levels.

By reducing the risk of pollution and ensuring compliance with environmental standards, the project supports the local community; both customers and the ecosystem. Overall, the improved infrastructure enhances the resilience of Towcester WRC to future challenges, providing long-term value to stakeholders.

Towcester WRC: Supply chain - key participants

- **Project delivery:** @one Alliance
- **CFD modelling for distribution chamber:** AECOM
- **Trial holes & civils:** Hercules Site Services
- **Over pumping:** Selwood
- **Temporary holding tanks:** Regal Tanks
- **Steel tanks:** Hayes GFS Ltd
- **Fine bubble diffused aeration system:** Suprafil Ltd
- **Mixers & ASP feed pumps:** Xylem Water Solutions UK Ltd
- **FST tanks:** FLI Precast Solutions
- **Wall couplings:** Freeflow Pipesystems Ltd
- **Wall panel inspections:** Mott MacDonald Bentley
- **Ferric dosing equipment:** EPS Water
- **Tertiary filter:** Bluewater Bio
- **Knife gate valves:** AVK UK Ltd
- **Scraper bridge:** Stortec Engineering Ltd
- **FST distribution chamber & RAS/SAS pump skid:** Glasswell & Last Ltd
- **RAS pumps:** Vogelsang Ltd
- **Pump skids:** Waveney's
- **Pipework:** Saint Gobain PAM
- **Sludge thickener plant:** Huber Technology Ltd
- **GRP kiosks:** NPS Engineering Group
- **MCCs, VSDs & LCP:** Paktronic Engineering Co Ltd
- **Stainless steel access platform & stairs:** Steelway
- **Flow controls:** Rotork
- **Flow test:** Z-Tech Control Systems Ltd

Conclusion

Through Anglian Water's investments into the infrastructure at Towcester WRC, the challenges of increased FFT demands, catchment growth, phosphorus removal requirements and stormwater management will be addressed. These upgrades not only ensure compliance with current environmental regulations but also position the site to meet future demands, supporting sustainable development in the region. The transformation at Towcester WRC demonstrates the importance of proactive planning and collaboration in achieving environmental and operational excellence, setting a benchmark for similar facilities across the industry. At the time of writing (January 2025), the project delivery team are finalising some key elements of the project.

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The @one Alliance is a collaboration of eight partner companies that each provide specialist knowledge allowing the Alliance to deliver complex delivery projects in the most efficient way, reducing the cost to Anglian Water's customers. The partners are Anglian Water Asset Delivery, Balfour Beatty, Barhale, Binnies, Mott MacDonald Bentley, Sweco, Skanska, and MWH Treatment.

