Written evidence from Xylem Water Solutions UK Ltd

Xylem is grateful for the opportunity to submit a response to this inquiry and welcomes the Environmental Audit Committee's initiative to investigate water quality in rivers. As a leading technology and solutions provider across the water sector, Xylem believes that the carry-over of the EU Water Framework Directive in the forthcoming Environmental Act is important to address the good ecological status of all surface water by 2027.

Xylem's position is that the Environmental Audit Committee should take account of the fact that advances in technology can allow significant improvements in water quality at substantially lower costs. Only by understanding the problem, can such improvements be brought about. To this end, the combination of advanced sensor technology with data driven solutions will allow stakeholders to improve waste water process, avoiding pollution incidents and optimising treatment processes. This approach will not only provide environmental improvements but it will also reduce cost increases for UK citizens. On this basis, Xylem would like to make the following recommendations for the Environmental Audit Committee to consider during the Environmental Act review process.

1. **Improve monitoring with digital enablement and data sharing**

To meet or even exceed the target in good ecological status of surface water, we recommend a greater focus on stakeholder accountability for water quality monitoring similar to the process taken by the WINEP initiative in the UK. To drive a reduction in phosphate in rivers, the WINEP project pushed Utilities to budget for the monitoring, control and reduction in nutrient concentrations in our rivers.[1]

Technologies are available today to identify river pollution with near-real time catchment monitoring. With the latest monitoring and telemetry technology, the UK can achieve the objective of providing sound evidence for policy makers to support specific measures to reduce pollution from diffuse sources, such as changes to farming practice. Sensors can support sustainable, transparent research platforms with clear visibility for all stakeholders.[2]

Some positive examples of holistic management of the watershed are already happening such as the ERA project developed by the University of Stirling.[3] Their work includes integrated regional scale environmental monitoring and management and harnesses satellite, airborne and *in-situ* sensor technologies to provide new understandings of aquatic and terrestrial system impacts and deliver data-driven solutions.

[1] https://consult.environment-agency.gov.uk/++preview++/environment-and-business/challenges-and-choices/user_uploads/water-industry-wastewater-challenge-rbmp-2021.pdf
[2] https://www.ysi.com/ysi-blog/water-blogged-blog/2013/03/river-water-quality-monitoring-tackles-diffuse-pollution
[3] https://www.stir.ac.uk/news/2020/09/world-leading-living-laboratory-for-central-scotland/

2. Reduce pollution at lower cost by adopting 'decision intelligence' tools

The United Kingdom can significantly improve river water quality by reducing nutrient discharges from sewage infrastructure at lower cost if it leverages proven smart water technologies designed to optimise wastewater management through real-time control.

Sewage collection networks create frequent pollution incidents in the United Kingdom, particularly during wet weather events that overwhelm combined sewer overflow systems. Multiple global examples demonstrate that smart technologies can significantly reduce these overflows, even without costly investments in 'grey infrastructure,' such as new sewage tunnels.

For example, the city of South Bend (Indiana, U.S.A.) implemented a smart sewer program and saved approximately £1.1 million in annual operating and maintenance costs. By using real-time data from a low-cost sewer sensor network to create a 'digital twin' of the sewer network, the City was able to fully utilise sewage retention capacity across the network, reducing the need for further infrastructure and saving the City approximately £370 million in capital work spend. Dry weather overflows have been eliminated and combined sewer overflow volumes reduced by more than 70 percent, or roughly 3.8 million cubic metres per year. *Escherichia coli* concentrations in the Saint Joseph River, which crosses the city, have dropped by more than 50% on average, improving the water quality.[4] Similar results have been achieved in cities around the world.

Digital twins can also be used to improve the effluent quality in wastewater treatment works at significantly lower cost, contributing to better environmental quality *and* reducing greenhouse gas emissions. For example, the city of Cuxhaven (Germany) implemented real-time decision support system for the optimisation of its wastewater treatment plant. The project implementation has optimised the process in its biological system, enabling full regulatory compliance of the effluent water quality and a 26% reduction in aeration energy usage, corresponding to 1.1 million kWh annually.[5]

Xylem technologies have demonstrated that very significant improvements in environmental quality are possible at lower cost if regulators and utilities work together to incentivise adoption of these proven solutions. We stand ready to provide further information and suggestions on how this can be achieved in partnership with technology providers.

Xylem hopes that the information above demonstrates how the integration of digital information and smart technologies can help water utilities meet their regulatory requirements. Xylem remains available to further answer questions or comments.

Best Regards,

Ian Thompson

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[4] https://www.xylem.com/en-uk/support/case-studies-and-white-papers/south-bend-indiana-reduces-combined-sewer-overflow-by-70-and-saves-$500-million/

[5] https://www.xylem.com/en-us/support/case-studies-white-papers/Cuxhaven-Germany-reduces-aeration-energy-use/

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