



WATER INDUSTRY

Remote Reservoir Monitoring for Operational Efficiency

**Client: Scottish Water
Site: Reservoir in the Scottish
Borders**



The Challenge

Reservoirs are often located in remote or rural areas and require regular, in-person monitoring and intervention to ensure safe and efficient operation. Operators frequently travel to multiple sites several times per week to manually check water-level gauges, and complete other operational requirements. Based on their observations and readings on the water level gauge, they decide whether operational action is required, such as adjusting or opening water valves.

This Reservoir is no exception and this manual process presents several challenges:

- Operational inefficiency: Frequent travel to remote sites consumes valuable staff time and resources. Access to water level data is required to plan the most efficient routes for operators between sites
- Cost implications: Multiple visits a week attending site in person, creates avoidable operational costs.
- Health and safety risks: In adverse weather conditions, travelling to the site poses risks to personnel. Additionally, reducing travel time and visits, assist operations to manage operator fatigue and assist in wellbeing .
- Scottish Water sought an innovative solution that would allow the gauge to be viewed remotely from their laptops, tablets and mobile phones, removing the need for additional site visits during out of hours periods.

The Solution

After assessing the requirement, Pointer carried out a full site survey to explore how an IP-based video solution could provide secure remote monitoring of the water gauge.

However, the project presented several complex engineering and compliance challenges.

Key Constraints

1. **GDPR and privacy compliance:** Although the reservoir water gauge was secured behind a fence and gate, it is located in a public area. This meant that any camera installation needed to comply with data protection regulations and minimise the risk of capturing unnecessary footage.
2. **No available power supply:** The remote location meant there were no existing power sources available to support a traditional camera installation.
3. **Infrastructure protection:** We wanted to preserve the integrity of the reservoir infrastructure. This meant we didn't want to penetrate the structure or install permanent fixings.

Designing an Innovative Solution

Privacy-first camera positioning

A Privacy Impact Assessment confirmed that mounting a PTZ camera on a nearby pole, allowing operator control to enhance the field of view of the water gauge would potentially cause undue concern from the public and nearby residents, breaching privacy requirements.

Instead, a fixed position camera was approved that would allow field of view, positioned close to the water gauge itself, below the narrow bridge structure above the reservoir. While this ensured minimal capture of surrounding areas, it introduced additional installation challenges.



Solar-powered remote monitoring

With no power available on site, the team identified a solar-powered camera solution.

However, implementing solar power in a remote Scottish environment required careful engineering considerations.

Pointer worked closely with the manufacturer to:

- Calculate the power consumption of the camera system
- Estimate operational runtime throughout the year
- Assess performance during winter months with limited daylight

Following these calculations, the team specified:

- Dual solar panels for increased energy generation
- Extended battery capacity to maintain operation during low-light periods
- Optimised panel positioning, installed at a 30° south-facing angle to maximise charging efficiency

Smart power management

To further improve efficiency and battery longevity, the system was designed so that the camera did not run continuously.

Instead, operators can log in to the system remotely and activate the camera only when required to check the gauge. After viewing the system, the operator can use the cloud user interface to disable the camera.

This approach delivered two key benefits:

- Extended battery life
- Reduced data capture, supporting GDPR compliance

Custom non-invasive mounting design

As we wanted to avoid drilling into the reservoir's bridge, Pointer's engineers developed a bespoke mounting solution.

The team designed a custom uni-strut bracket system that uses clamps rather than screws or permanent fixings, ensuring the installation:

- Protects the structural integrity of the reservoir
- Meets the customer's engineering requirements
- Can be removed or adjusted without impacting the infrastructure

The bracket system was developed in collaboration with TP-Link to ensure compatibility with the solar-powered camera solution.

Future proofing for ongoing maintenance

To further enhance safety and usability, the camera was installed on a fixed goose neck bracket that can be pivoted.

This allowed the camera to be positioned close to the gauge for clear visibility while also enabling engineers to retract the unit for safe maintenance access without needing to work over the reservoir.

Reliable connectivity

The final stage of the project involved ensuring reliable communication with the cloud based management software. Pointer conducted signal testing on-site to determine the strongest available network coverage and selected an appropriate SIM-based connectivity solution to transmit the camera feed securely to the operations team.

The Pointer team then:

- Configured all user accounts
- Integrated the system with the client's monitoring environment
- Delivered training to ensure operators could easily access and manage the system



The Results

The completed solution enables the operations team at Scottish Water to view the reservoir gauge remotely from their laptops, tablets and mobile devices, enabling route planning efficiencies and removing the need for visiting site several times a week, including while on call out of hours.

Key benefits include:

- Improved operational efficiency by eliminating unnecessary travel
- Reduced operational costs
- Improved staff safety by limiting travel to the remote site in adverse weather
- Privacy-compliant monitoring
- Sustainable operation through solar power

As Graeme Davidson, Protective Security Specialist, Resilience & Security at Scottish Water, commented:

"Pointer was given a challenging brief to come up with a workable innovative solution, that was cost effective and would provide tangible resource and time savings to the business, with additional improved employee safety. The implemented solution will provide this and will be rolled out to other suitable sites."

Innovation Beyond Security

This project demonstrates how modern monitoring technology can go beyond traditional site protection. By combining solar power, remote connectivity and privacy-conscious design, Pointer delivered a solution that improves efficiency while maintaining compliance and protecting critical infrastructure.

The installation at this Scottish Borders reservoir has proven that intelligent monitoring can reduce site visits, improve staff safety, and provide real-time insights. Its success creates opportunities to roll out similar solutions across other utility sites, unlocking further efficiencies.

Looking to Improve Operational Efficiency?

If you operate remote or hard-to-access assets, Pointer can help you monitor them more effectively. We design practical solutions that improve visibility, reduce costs and enhance safety.

Get in touch to see how remote monitoring could transform your operations:

www.pointer.co.uk

