The South Holland Internal Drainage Board (SHIDB) is in charge of the maintenance of 16 pumping stations and seven tidally controlled gravity sluices connected to a network of 704km of drainage channel. Pictured is Sutton Bridge Sluice

Cellular routers rally to the fight against flooding

The low-lying South Holland district of Lincolnshire is a key area for the UK economy, with more than 38,000 hectares of fertile land. Mobile routing technology from **Sarian Systems** is now playing a major role in assisting the South Holland Internal Drainage Board in water-level management

Being low-lying areas much below sea level, some parts of the UK are constantly at risk from flooding, which is why drainage districts have been established in order to prevent permanent flooding and water logging. The drainage districts are administered by approximately 200 drainage boards, which are responsible for providing flood protection and water-level management service, involving the improvement and maintenance of rivers, drainage channels and pumping stations to evacuate water.

Despite flooding in the UK in recent years, the South Holland district of Lincolnshire, named so because it is an area of low-lying land akin to Holland, has not been adversely affected. This is largely thanks to the swift action taken by the South Holland Internal Drainage Board (SHIDB). SHIDB is responsible for the drainage of the 38,441 hectares of valuable fertile land sandwiched between the rivers Welland and Nene. In particular, SHIDB is in charge of the maintenance of 16 pumping stations and seven tidally controlled gravity sluices connected to a network of 704km of drainage channel.

SHIDB engaged Cougar Automation, a systems integrator specialising primarily in the water treatment business, to install a monitoring system that would control 16 unmanned remote pumping stations of varying sizes in the South Holland district, from SHIDB's office at Holbeach. Cougar turned to Sarian Systems, a Digi International company, whose mobile routing technology is now playing a major role in assisting SHIDB in water-level management.

Phase one of the deployment saw Sarian DR6410 routers being used for both fixed line and mobile communications

The solution

Phase one of the deployment, which was completed in November 2008, saw the Sarian DR6410 routers being used for both fixed line and mobile communications. While BT broadband connections have been deployed where possible, mobile networks are being used in the form of dual Vodafone and T-Mobile SIM cards in some of the more remote locations in order to provide failover in the event of downtime. Industrial wireless access points (APs) are also present at selected sites to ensure that engineers can still access the pumping stations in the event of bad weather. Each pumping station has automatic controls - telemetry - capability for central monitoring and an alarm system detecting fixed-line failure.

Transmitting data every 10 to 15 seconds, Sarian's routers not only enable SHIDB to monitor the district's water levels and status of each site's equipment in real-time, but also permit the engineers to remotely switch pumps on and off, as well as adjust the target water levels and pump sequences. Such remote capabilities mean that SHIDB can easily scan and assess a site from the office first, before making the decision whether to dispatch a team to deal with any issues.

Cougar Automation has configured SHIDB's telemetry system to allow the Sarian routers to establish a secure virtual private network (VPN) tunnel back to the master router from each remote location. Some sites are also equipped with an IP camera which feeds images back to the office via the Sarian device. This function gives SHIDB real-time visual images of water levels, as well as acting as a valuable intruder detection system and safety monitoring device when engineers need to remotely control pumps on an automatic basis. "CCTV gives SHIDB much-needed visibility as well as control over South Holland's drainage network, permitting engineers to monitor each site closely without impacting on manpower," says Stuart Gaunt, principal project engineer at Cougar Automation.

Phase two of the Sarian deployment, which is due to start before the end of this year, will involve the installation of additional specialised features to allow SHIDB to record and archive water levels and pump run hours, as well as any action taken by the engineers, for hydrological modelling purposes. Such functionality will allow SHIDB and other internal drainage boards to compare and contrast rainfall in the district with the amount of water discharged from the catchment area, among other details.

The results

Sarian's cellular technology, coupled with Cougar Automation's advanced telecommunications systems, allows SHIDB to provide even more efficient management of water levels and to ensure that continuous and effective actions are being taken to reduce risk of flooding. "The South Holland district is a key area for the UK economy, and the local community - over 60,000 residents - depends on us to prevent permanent flooding and water logging," says Karl Vines, SHIDB district engineer. "Thanks to Sarian's routers we are now able to prioritise situations and deal with potential issues before they arise, as well as allocate manpower accordingly. In this way, our engineers will always be in the right place at the right time."

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