

TRUE TEAMWORK



enables Homeowner's Association to protect delicate waterway

Managing two ageing adjacent wastewater treatment plants that are nearing the end of their days... This can be a tall order at the best of times – but how about when discharge is into one of the most diverse and sensitive waterways in the world – home to more species of fish than any other river of its size in the whole of North America. Some might choose to steer clear of this very sizeable challenge.

The need to meet increasingly tight restrictions, particularly on phosphorus levels – and a site so downright awkward that at one point it looked like helicopters might be needed for the delivery of new equipment! – but no. The very determined Lockerbie Homeowner's Association in Mountain Brook, Birmingham, Alabama decided to invest in – and take responsibility for a brand-new treatment plant.

When consulting state-wide wastewater company, Living Water Services, one option put forward was to create a new lift station where effluent could be pumped to the Jefferson County Sewer. Owning, managing or serving 58 wastewater facilities all over Alabama and carrying out lab tests for another 49, Living Water consulted their key contacts for the best solution, including Krebs Engineering.

"The old plants just weren't designed for today's needs," said Tyler McKeller, Co-owner of Living Water Services. "Discharge levels were being met, but only by adding large volumes of chemicals – around 15-20 types, which all came with significant cost and labor. The first plant – around 30 years old – couldn't cope very much longer – and the adjacent plant, some 22 years old, was pretty basic at best.

With discharge into a tributary of such a delicate waterway as the Cahaba River, the pressure was really on to find a dependable, long-term, cost-effective solution."

There was no government funding or grants. Expectation of the Lockerbie Homeowner's Association for its new wastewater treatment plant to meet all requirements, was exceptionally high, as Gary Huffman, President of Krebs Engineering, explained:

"People paying for such an important service out of their own pockets understandably want it to be right. They don't want to have to constantly worry about the day-to-day operation or the implications of not meeting their permit. They want complete peace of mind."

He added; "We were all concerned about the existing systems – and how we could bring about a smooth-running,



long-lasting treatment plant – as well as get round the severe constraints of such a small and awkwardly located site. The old systems did not have the capability to remove phosphorus without additives, so Tyler and Krebs looked at a treatment plant which the more it could achieve biologically, the less dependence there would be on chemicals. We both knew for sure that restrictions on discharge would become increasingly tighter in the future.”

Both Krebs and Tyler McKeller knew of the reputation of Lakeside Equipment Corporation, so this is where their agent Ed Moore at The Eshelman Company came in to weigh up the requirements and the logistics of a new package plant for Lockerbie.

“Ed is a good listener and very knowledgeable,” said Tyler McKeller. “He knows how to meet needs and pull things together.”

With Krebs Engineering founded in 1926, The Eshelman Company in 1927 – and Lakeside in 1928, there was no shortage of company experience to find the best possible solution for Lockerbie.

“Considering the age of the plants,” said The Eshelman Company’s Ed Moore, “Living Water Services was doing a tremendous job in meeting all permit requirements, especially in Alabama’s hot summers. We knew very well that to safeguard the environment and bring about the upgrade at such a complicated

location, we’d all have to work closely together.” As Gary Huffman rightly said, “Expectation from the Homeowner’s Association was very high. Naturally, they had their concerns and wanted to ensure that investment in the new plant would provide the right protection for such an important asset Birmingham and Alabama has in the Cahaba River. So, at an early stage we started speaking to Lakeside to see what they could offer – and how the new equipment could be installed.”

A compact design that would work for the treatment plant’s small footprint (by eliminating external clarifiers and return activated sludge pumping) was essential, so Lakeside, through their Regional Sales Manager, Jim Aitkenhead, proposed a Continuous-feed Sequencing Batch Reactor (CSBR). Designed as a cost-effective solution for biological treatment processes, the fully automated CSBR treats raw wastewater flow in a single basin using timed based phases to fill, mix, aerate, settle and decant waste sludge. Compared to a conventional Sequencing Batch Reactor, the CSBR system allows raw wastewater to continuously flow into the reactor basin during the treatment cycles – including during the settling and decanting phase. A baffle wall prevents short-circuiting as the flow travels from the reactor’s pre-react zone. It also equally distributes the flow into the main react zone, where aeration, settling

and decanting occur. The process is designed to produce a clear effluent – without foam or floating scum.

Tyler McKeller of Living Water Services, continued: “As well as the strong recommendations from Ed Moore and Krebs, I knew of Lakeside’s solid reputation from other treatment plants, but to be honest, I wasn’t sure how the system could handle the phosphorous biologically – especially without us having to continue to use lots of chemicals. On top of the manhours to go to site, the cost from April through to October had risen to around \$1500 per month.”

With Living Water, Krebs and Eshelman all based within around 10-15 minutes of the Lockerbie plant, logistics would be much simpler than for many upgrades (local controls business Revere Control Systems was also lined up), but first, the close-knit team had to keep one plant online during the upgrade and work out how best to get the new CSBR to site.

“First, the older of the plants was shut down,” said Gary Huffman of Krebs. “Working with Livingston-based Goldman Contracting, we extended the existing slab so that we could repurpose an existing tank to store sludge. We didn’t have any other choice.”

Bringing in a crane truck would have been easy – but for an 8-lane highway less than 100 yards to the east of the treatment plant. That left a small, winding gravel road, as Ed Moore from



The Eshelman Company explains:

"Probably the best way to describe the location of the plant is that it is 50-feet down a hole!" he said. "Setting down an air conditioner is one thing, but a 20,000-pound steel fabrication? For the first time in my career I even went and enquired about a helicopter to be used because that seemed like the best way of doing it – but no surprise really that the quote I received would have taken us somewhat over budget! Again, we all put our heads together – and Thad Goldman (Goldman Contracting) and Lakeside worked together very

innovatively to have the CSBR designed and manufactured in two parts."

He continued: "Easy to say now (!) but it was fascinating to watch the delivery of the CSBR. An 18-wheeler reversing down this small winding gravel road, performing a 180-degree switchback – swinging the equipment out over the existing embankment and lowering it very precisely in to place. Doing all that – twice. Amazing." Tyler McKeller of Living Water Services, agreed: "The local company CraneWorks of Birmingham did a fantastic job. I'm still amazed at how they got the plant in!"

Then came the putting together of the CSBR, with a navy-certified welder brought in specially from Mobile, Alabama-based shipbuilding company, Austal.

Gary Huffman from Krebs Engineering added: "We're a close community of companies, ready to respond. Everything was a true work-together proposition – but now we had to put the equipment to the test. We needed to show the Lockerbie Homeowner's Association that their investment in equipment designed for 25-plus years of very reliable, low-maintenance operation was money well spent."



The new plant has now been operating since January 2020. Some early discrepancies with the site's power supply were soon solved.

Tyler McKeller commented: "As with all new equipment it can take a little while to get used to. We needed to

find the best way of understanding the control system, but since then, from an operator's point of view, we haven't had a single issue – and we know that if we ever need advice we can easily reach out to Jim Aitkenhead at Lakeside and Ed Moore at The Eshelman Company.

They've both been top notch."

He continued: "The plant is performing very well indeed. It produces immaculate water. We're now getting TSS (Total Suspended Solids) of between just 1 or 2 – and for our 0.3 mg per litre limit on phosphorus, we're typically getting 0.1. You just wouldn't expect to see those results out of a plant that is non-filtered. This is all the more phenomenal because compared to before, we're only having to use a very small amount of chemicals when flows are low and temperatures are high."

Gary Huffman from Krebs Engineering, agrees: "The operation of the plant has been tremendous. The effluent looks very good indeed."

With the Cahaba River regarded as a natural preserve, the new Lockerbie plant – largely unmanned – which is under the jurisdiction of the ADEM (Alabama Department of Environmental Management) has already been visited by the EPA (Environmental Protection Agency).

Tyler McKeller said: "They were very impressed with the outstanding water quality. The discharge point here is not forgiving at all so we have to be right on top of the operation – but now we have the new treatment system and our very good monitoring system, we have every confidence in it."

Permit requirements are now being met comfortably, and with the saving for the customer on chemicals set for around \$7,000 per year, this unofficial partnership of like-minded Alabama companies has every reason to be confident about



the future wellbeing of the Lockerbie wastewater facility.

"What we all like," said Ed Moore from The Eshelman Company, "is that Lakeside is always responsive. They take huge pride in the longevity and quality of their equipment. We know that in the

future, regardless of the age of a system, they keep exceptionally good records and documentation – and that we can still get parts. I know for sure that they will always help us find a way to keep everything shipshape. This plant is a great 'Show and Tell'."

Living Water's Tyler McKeller concluded: "When Jim Aitkenhead at Lakeside said that their CSBR could make such an impact on the phosphorous biologically, I thought I'd need to see it to believe it – but he was right." ✖

