Pumping Operations Trial

October 2023 – March 2024

Background

We own and operate two major land drainage pumping stations, these work in combination with circa 300km of raised embankments and 190km of waterways to keep approximately 8,000 local homes and 1,200 commercial properties and over 56,000 hectares of the most productive agricultural land in the country dry, as well as enable navigation within the majority of the system.

Whilst the Fens is known for being flat, the catchment's higher land towards and beyond the A1 is very responsive to rainfall and funnels water quickly into the lowest land in the country, below sea level.

We provide the second tier of drainage with 25 Internal Drainage Boards and a handful of private districts also either pumping or gravity draining into our system. We have no operational control over the 70+ pumping stations that add water into our system.

Our booster station at Bevill's Leam elevates and transfers water from the lowest land in the country (we call this our Bevill's Pond) into the main Middle Level drainage system (we call this our St Germans Pond). Bevill's Leam pumping station was constructed in the 1980s and requires major refurbishment in the coming years.

Our pumping station at Wiggenhall St Germans is the largest land drainage pumping station in the UK. It came online in 2010 and is the only outfall from our system, pumping excess water from the whole catchment into the Great Ouse Tidal River.

A map of our system is available HERE.

Context

Bevill's Leam and St Germans, in their automatic operational modes, are reactive. This means they start and stop pumping to manage water levels based the water levels that result from rainfall. St Germans' operation is based on water levels taken at the station and a gauge close to Ramsey.

In times of flood concern, Bevill's is operated manually on-site. St Germans was designed to be an automatic unmanned station, and this has been the way it has operated since it came online. Manual fine-tuning of the parameters that control the automation can be made.

The biggest operational challenge we have in times of flood concern is the ability to get vast amounts of water through Bevill's Leam Pumping Station and then through the main system to St Germans. Both stations need to pump early to lower water levels, creating a 'hole' which then draws water to them, given the fact there is no fall/gradient in their respective ponds.

There are major influences on the above which are not catered for within St Germans' automated programming and therefore the automatic pumping at St Germans may not be as optimised or as efficient as it could be.

Wind is a major factor, either 'pushing' water towards, or away from, St Germans.

Tidal conditions in the Great Ouse are also a factor as it is four times more efficient to pump against a low tide compared to a high tide. Sea level rise and increased bed levels in the Great Ouse Tidal River (given the siltation trend and current accretion in The Wash) will likely magnify our operational challenges and costs over the years and decades ahead.

How saturated the catchment is, has a major influence. The wetter the catchment, the quicker water arrives either via gravity from the high land to the west, or inputs into our system via the IDB pumps.

Wetter winters and more intense, and frequent, rainfall events will also mean we need to be able to better manage extremes. Given our changing climate, we need to explore if and how the system could be operated more efficiently and effectively.

The trial

We are undertaking a trial over the course of the 2023/24 'pumping season' to test if and how manual intervention could result in more efficient and effective operation of St Germans pumping station.

The trial involves our engineers making manual adjustments to the pump operation by factoring in tidal conditions, wind, forecast rainfall, catchment and river conditions within the decision of when and how much to pump.

The aim is that the learning from the trial will inform our future operations and potentially could also be used in future to adjust the station's automated system.

We will consider the results and learning from the trial in 2024 before making any decisions on any permanent changes to our operations.

Storm Babet

Ideally the first experiences of the trial would have been within less significant rainfall conditions giving greater opportunity to pre-engage with users and beneficiaries of our system and operations.

Storm Babet saw 60mm of rain fall across our catchment compared to 40mm within the December 2020 flood event, when we had concerns about potential breaches within our system. The key difference between Babet and 2020 was that in 2020 the catchment was saturated and with Babet the ground was dryer and was able to absorb much of the rainfall.

Ahead of Babet we created a 'hole' by lowering levels sooner and swifter than the automated system would have done. The forecast rainfall materialised and we successfully moved significant amounts of water through our system without concern about breaching of embankments.

Approximately 11,000 megalitres of water was pumped at St Germans, this is equivalent to 4,400 Olympic sized swimming pools.

With the catchment subsequently saturated following Storm Babet, leading into the weekend of 28th/29th October, with rainfall forecast, we again created a 'hole'. However, this time the forecast rainfall did not materialise and river levels took longer to rise again.

Feedback

We will continue to learn and fine-tune as we work through the trial and really value the feedback from users and beneficiaries of the system. We need to understand the consequences and issues any change in operation causes, as well as the benefits.

Key themes from feedback so far:

- Earlier and swifter lowing of levels has an impact on the navigation community moored within our main drainage system.
- The need for early, clear communication and explanation of our operations is important.
- The ability to speak to a member of MLC staff during operational response is valued by boaters.

We will factor feedback in alongside all our own learning from the trial. We will fine-tune as we go and review the learning from the trial in 2024 ahead of making any decisions about permanent operations. Our Navigation Advisory Committee will be involved in the review.

Paul Burrows
Chief Executive
06 November 2023