



PROJECT DEWATERING

A HÖLSCHER WASSERBAU COMPANY



DESIGN. SUPPLY. SUPPORT

Groundwater Treatment Project of the Year

Name: Project F

Note: Due to the sensitive nature of this construction site, PDL has signed a non-disclosure agreement which prohibits the sharing of wider project details, photographs, and associated design work. PDL trusts this will not affect the judges' assessment, as we believe our involvement highlights our capability to deliver complex groundwater control and treatment of contaminants that are highly relevant in today's construction sector.

Introduction

Project F was delivered by Project Dewatering Ltd (PDL) in response to a dual challenge: the need to control difficult groundwater conditions close to nature reserves during excavations, and the requirement to manage PFAS-impacted water to one of the most stringent discharge standards in the UK.

The project demonstrates the application of staged testing to inform both the final design and the overall system. Each stage of design and delivery built upon the lessons of the previous one, ensuring that the final system was technically robust while also accounting for long-term groundwater behaviour and environmental protection.

Planning and Early Challenges

From the outset, it was evident that groundwater ingress would be significant and that a dedicated dewatering and treatment system would be required. The scale of the excavations meant that discharge from the aquifer could reach very high flow rates. Acquiring a licensed discharge in such a remote area, close to other groundwater users & attempting to treat PFAS at such volumes would have required an extensive plant footprint, high operational costs, increased risks, and substantial environmental impacts.

Recognising these challenges, PDL proposed a groundwater control strategy which considered each constraint: To limit groundwater flow, the construction of a perimeter slurry wall which controls groundwater at source. By containing inflows before they reached the excavation, discharge volumes could be reduced to levels that made treatment both technically and economically viable. This change in strategy proved decisive in addressing groundwater control while enabling effective PFAS treatment.

The creation of a slurry wall in very granular soils required PDL to develop a programme of staged testing and integrated design, which was presented to the client as the framework for delivery.

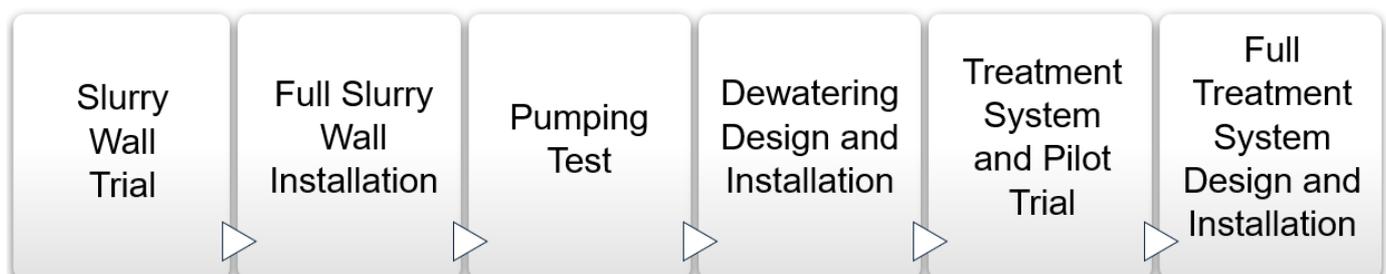


Figure 1: Staged testing procedure presented to the client.

Slurry Wall

The slurry wall was designed to encircle the excavation and form a continuous temporary hydraulic barrier. Extending for over 1200m to on top of the CLAY at 7m deep, its alignment had to be constructed immediately alongside ecological protection measures, requiring careful sequencing and close monitoring. The slurry was designed to allow for later breaching, ensuring no permanent groundwater cut-off remained.

To confirm dimensions and viscosity, a 30 m trial trench was excavated, filled with bentonite slurry, and tested by short-term pumping (see figure 2 and figure 3). Monitoring on either side of the trench confirmed wall integrity but highlighted the need for grout installation at depth to ensure continuity through permeable horizons. Temporary dewatering was also required to form a deeper leader trench, enabling a secure key into the underlying strata. These refinements were incorporated into the full construction, ensuring reliable barrier performance.

A grout batching plant was established, with fluid grout pumped to leader trenches locally dewatered by wellpoints in short sections. This allowed the granular soil to remain open without trench support, and natural soil was displaced by grout. Penetration into granular soils down to the clay was observed, achieving reduced water flow with relative ease.

On completion, the wall significantly reduced inflows while allowing natural groundwater pathways to re-establish after construction, through both natural slurry breakdown and intrusive breaching at specified locations. The wall not only contained groundwater but also stabilised excavation conditions, reduced treatment volumes, and minimised the project's environmental footprint.

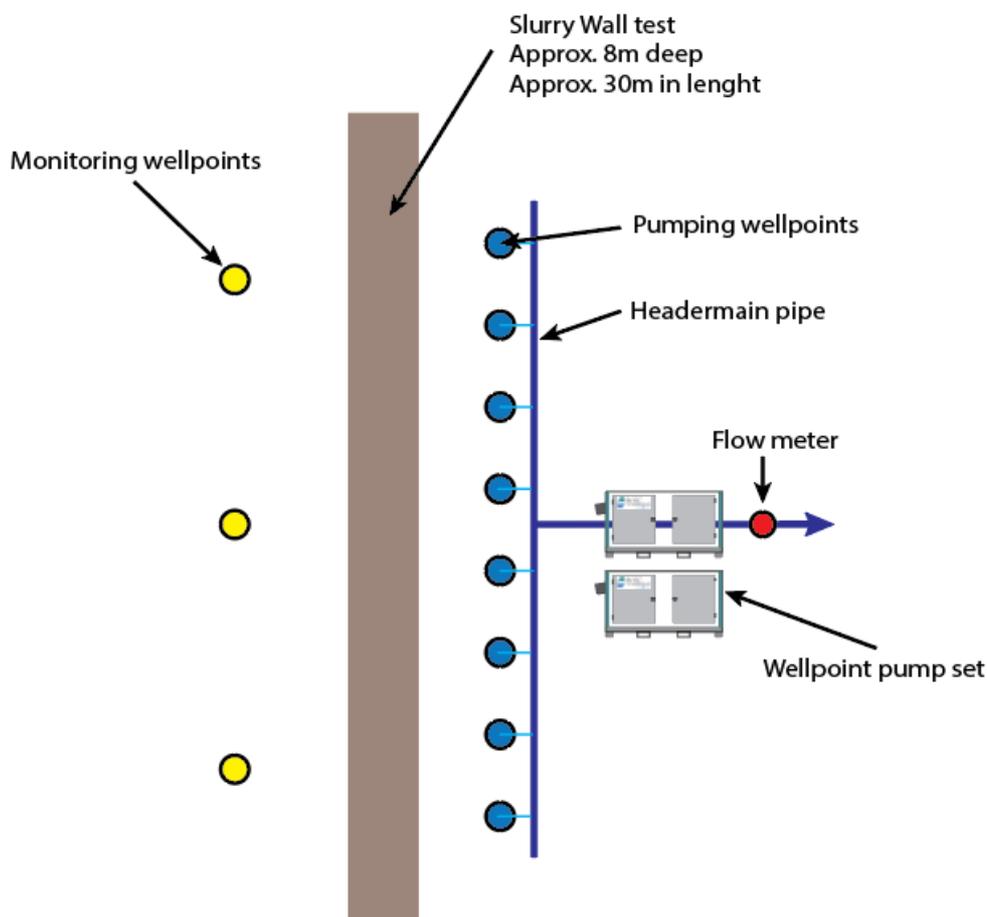


Figure 2: Indicative layout of the pumping trial carried out by PDL.

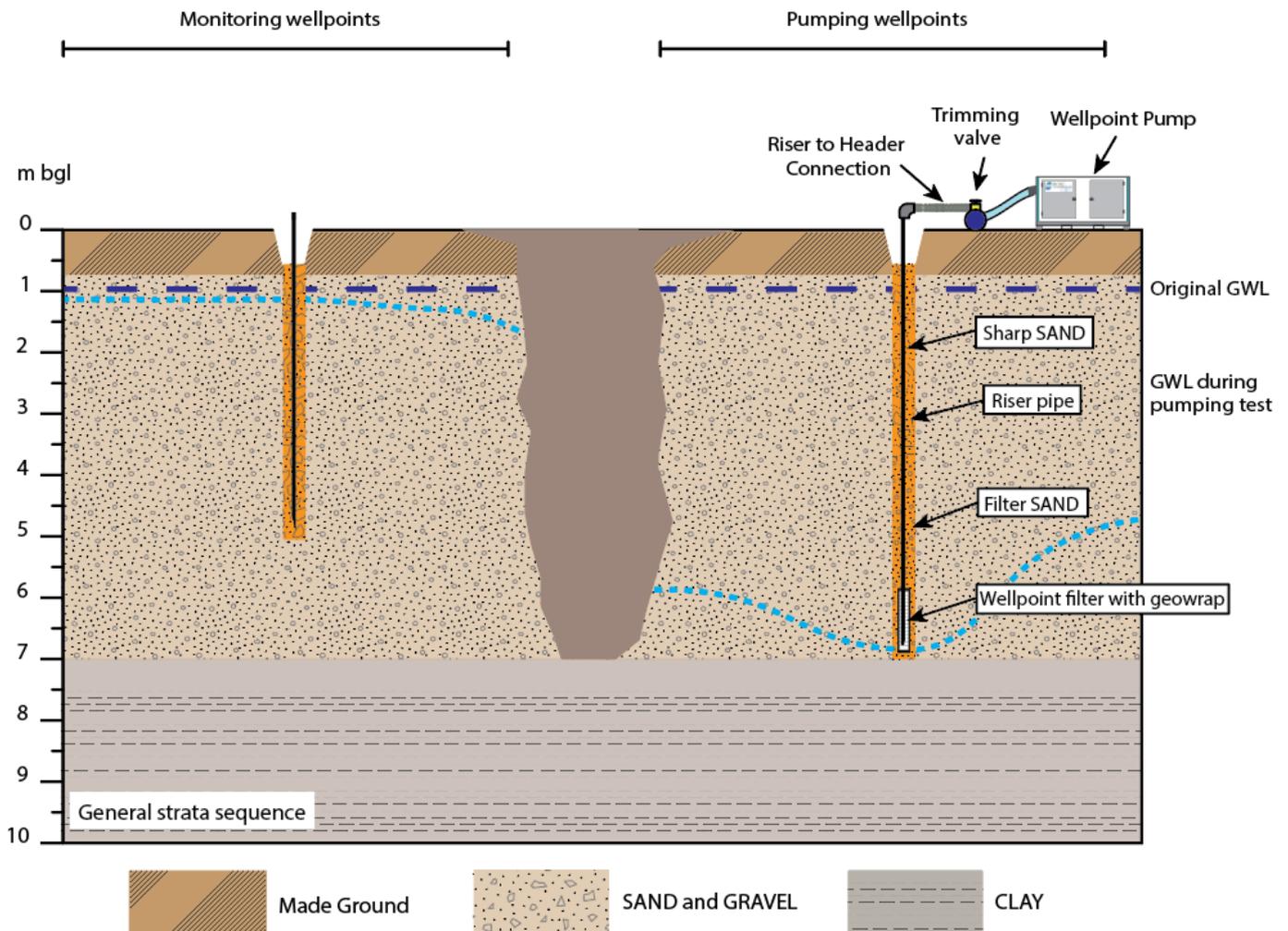


Figure 3: Indicative cross section drawing of the pumping test conducted by PDL.

Pump Testing and Aquifer Characterisation

With the slurry wall in place, attention turned to understanding how the aquifer would respond to abstraction. Pumping tests were undertaken around the new barrier to measure drawdown, confirm aquifer characteristics, and establish sustainable pumping rates.

The test largely comprised of pumping from internal wellpoints and observing drawdown either side of the slurry wall for a prolonged time. Discharge water was sent to soakaway outside the site excavation boundary post treatment.

The tests demonstrated abstraction rates of up to 20 litres per second during active dewatering, reducing to around 10 litres per second for maintenance pumping which achieved a suitable groundwater drawdown of ~4.5m that was below almost all excavations required. The results validated predictive modelling & confirmed the slurry wall's effectiveness which provided assurance that the aquifer could respond effectively to the combined demands of dewatering and treatment.

These findings formed the basis for the next stage: installation of the full dewatering system.

Dewatering System and Pilot Trials

A combination of wellpoints and deepwells was installed to provide flexibility across the excavation footprint. Before the treatment plant was brought online, PDL used this infrastructure to conduct a pilot trial. Groundwater was abstracted from the wellpoints and deepwells, collected in a holding tank, and passed through a booster set into carbon filters. This exercise replicated the full treatment process under site conditions, but at a reduced flow rate and scale.

The trial confirmed that the proposed treatment system could accommodate flows from the dewatering system and successfully reduce PFAS concentrations to below the target limit of 0.01 µg/L.

PFAS Water Treatment System

The pilot results directly informed the final treatment plant design. Due to restricted access and space constraints, large-capacity carbon vessels (AquaSorber 22-60) were selected to maximise run times between media exchanges and ensure sufficient contact time.

Three vessels, each 22 m³ in volume and capable of 100 m³/hr flow, were installed in series on a concrete bunded slab, providing stability and safe access for specialist vehicle movements. See indicative layout in figure 4 below.

Groundwater from the dewatering network was manifolded and passed through the vessels. Each unit was fitted with sampling points before and after carbon contact to monitor performance. The oversized vessels provided extended contact times, ensuring reliable PFAS removal and resilience against fluctuations in influent concentrations.

Continuous monitoring confirmed compliance with the discharge requirement of <0.01 µg/L.

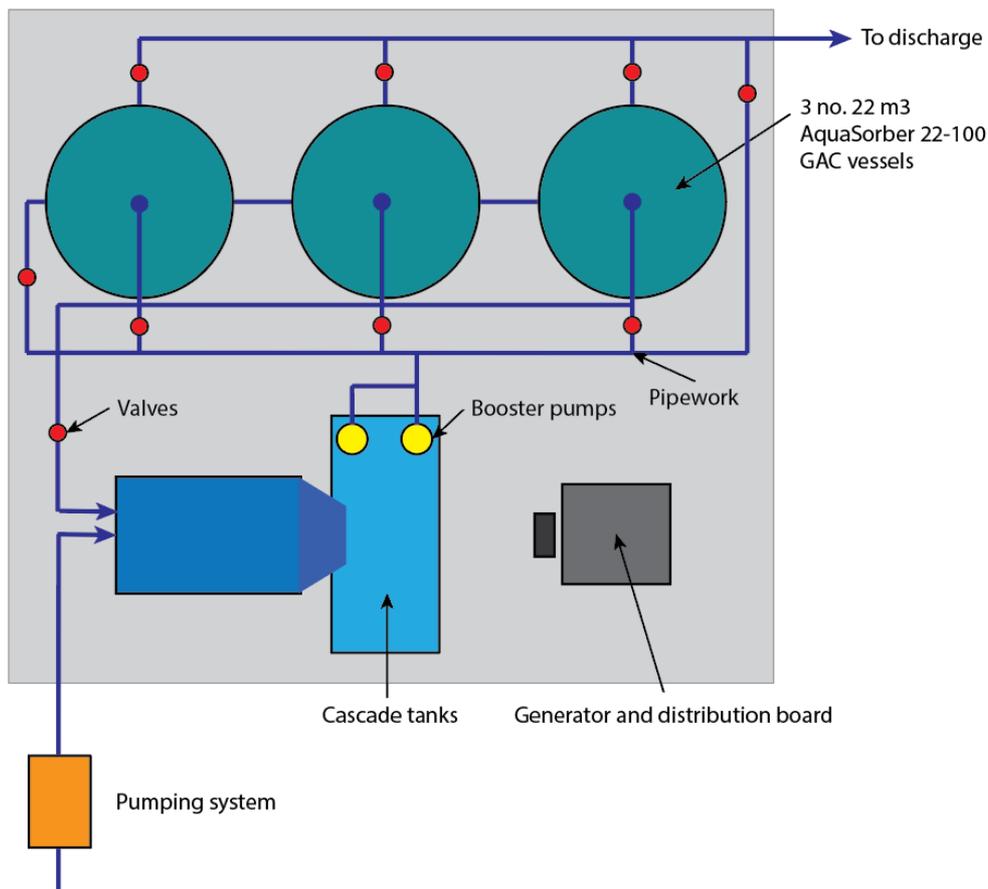


Figure 4: Indicative layout of the mobile water treatment system.

Installed Infrastructure

The final integrated system delivered under Project F comprised:

- A perimeter slurry wall of over 1 km in length and up to 7m deep, providing robust groundwater containment.
- An internal network of wellpoints and boreholes, giving flexible abstraction capacity for dewatering.
- Automated submersible pumps with smart controls and protection systems.
- A dedicated water treatment compound with three large activated carbon vessels operating in series.
- Comprehensive monitoring infrastructure, including flow metering and sampling ports, ensuring full visibility of system performance.

Innovation and Technical Merit

Project F demonstrated how different elements of groundwater management can be integrated into a single system. Notable technical features included:

- The combination of a slurry wall with active dewatering and treatment, reducing inflows at source and limiting treatment volumes.
- The dual use of installed wellpoints for both dewatering and treatment trials, making best use of site infrastructure.
- Oversized carbon filters providing extended contact times and added protection against PFAS breakthrough.
- Design decisions made with ecological sensitivities in mind, supported by a programme of monitoring to ensure compliance.

Outcomes and Benefits

The slurry wall reduced inflows to a manageable level, enabling safe excavation while lowering treatment volumes. Pumping tests confirmed design assumptions and sustainable abstraction rates. The dewatering system installed provided adequate drawdown for the groundworks to proceed. The treatment plant consistently met its stringent discharge limit, providing a secure means of managing PFAS at site scale. PDL remained involved for 60 months, supporting the client with pumping and treatment operations through to project completion this year.

Beyond meeting project objectives, the integrated approach provided lessons for future schemes where dewatering and contamination challenges overlap.

This project provided an opportunity to further investigate PFAS treatment using established construction water treatment systems. During delivery, we reviewed a range of treatment media and have since identified alternative options that could significantly reduce treatment plant size. These products are still at an early stage of development and are yet to be tested in the UK.

Conclusion

Project F showed that complex hydrogeological and contamination problems can be addressed through careful planning, staged testing, and integrated design. Each part of the system, from the slurry wall to the treatment plant, played a role in delivering a safe, practical, and technically robust outcome.