



Appledore's Full Pump and Water Control Solution

Client: Environment Agency
Location: Romney Marsh, Kent

Nestled between Rye and Ashford on the Royal Military Canal, Appledore Pumping Station is an Environment Agency asset that has stood watch over Romney Marsh since the late 1940s. For over six decades, the station's two axial flow pumps — driven by Ruston Hornsby single cylinder oil engines — kept the marsh's water levels in check, operating far beyond their intended design life. When the machinery was finally deemed inoperable, the pumps and engines were decommissioned. One engine found a second life in a museum, while three temporary submersible pumps held the line while a permanent solution was sought.

The Environment Agency's requirements for the replacement scheme were stringent. The new pumps had to be fish-friendly, capable of passing 500 litres per second each, and — most critically — had to maintain existing winter drain levels without any alteration to the pumping station forebay. That last condition proved to be the crux of the challenge, and one that would defeat several experienced pump suppliers before a solution was found.

The original station used suction-based axial flow pumps, which required only a shallow intake sump. Modern bowl pumps, by contrast, need a fully submerged impeller — and the existing sump simply wasn't deep enough to achieve the submergence required to prevent cavitation. Multiple suppliers examined the problem and came up empty. The options on the table were unappealing: lower the drain by 500mm and risk flooding significant areas of the marsh, undertake major and prohibitively costly civil works to deepen the sump, or revert to the 1948 design and accept the use of notoriously unreliable vacuum pumps. None were acceptable to the Environment Agency, and none moved the project forward.

The EA turned to ACE. Known for finding solutions others overlook, ACE visited the site and identified an approach that had been consistently missed. Their partners, Pentair Nijhuis — recognised as the hydraulic centre of excellence within the \$6.3 billion Pentair Group — modelled the proposal using in-house CFD software. The results were conclusive: a fish-friendly submersible pump could be installed without altering the forebay or compromising the drain's winter levels. It was the breakthrough the project needed.



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With the core engineering challenge resolved, attention turned to flood defence. The Environment Agency required two independent lines of protection, and ACE had well-proven answers for both. For the first line, ACE supplied their HDPE pumped flap valve — lightweight, near-neutrally buoyant, and considerably more ecologically sympathetic than traditional cast iron equivalents. Its lower head loss reduces the energy required per cubic metre pumped, delivering both economic and environmental savings. Its wider opening, made possible by the reduced weight, also significantly lowers the risk to fish during passage — an important consideration on a scheme where ecological impact was under close scrutiny.

For the second line of defence, rather than specifying a conventional automated knife gate valve — which requires actuators, routine maintenance, and integration into the motor control centre — ACE introduced the WaStop. This passive inline check valve, installed directly behind the flap valve on the outfall, requires no control logic and minimal ongoing maintenance. A simple breather pipe was all that was needed to prevent vacuum stress on the membrane at pump shutdown, completing a robust two-line flood defence system with minimal mechanical complexity.

All pumps were fitted with variable frequency drives, allowing precise flow control and continuous operation close to peak efficiency. Beyond the energy and carbon savings this delivers, the drives provide a slow, controlled start-up — giving fish that shelter within the bell mouth of the pumps a chance to move clear before full speed is reached. The EA's South East MEICA team were closely involved throughout, providing technical guidance that ensured every aspect of the scheme met their expectations.

Team van Oord, acting as the EA's PDU framework contractor for the South East, managed on-site delivery with precision — collaborating with ACE to optimise pipework layouts, minimise bends, replace the outfall infrastructure, conduct surveys, and oversee all lifting operations. Their project management ensured that a technically complex scheme was delivered smoothly and to the satisfaction of all parties.



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