



Issue 3

Autumn 2011

# Bedford Pumps News

## Bedford Pumps' unique solution completes biggest M & E project for the Environment Agency

Bedford Pumps Ltd has completed its largest project to date with the refurbishment of the pumps and MCC at Altmouth Pumping Station, situated at the mouth of the River Alt in Merseyside.

The Altmouth Pumping Station reduces the risk of flooding to more than 9000 properties and provides protection to approximately 20 square miles of grade A agricultural land.

The low-lying surrounding area of Formby, just South of Southport, has a history of flooding since the land was reclaimed from the sea by local monks in the 13<sup>th</sup> century. Following extensive flooding in the mid 1950's the Altmouth Pumping Station was constructed in 1972 to drain the land for agricultural purposes and at that time was the largest station of its type in Europe. Due to its age and the condition of the pumping equipment the decision was made to invest £10.7M refurbishing the site.



*Altmouth Pumping Station constructed in 1972*

The pumping station used both Storm and Dry Weather Flow pumps which had come to the end of their design life and were becoming increasingly expensive to maintain. The Environment Agency put its MEICA (Mechanical, Electrical, Instrumentation, Control and Automation) team forward to work with the key suppliers in finalising the design for Altmouth.



*Bedford Pumps' Storm Pump for Altmouth P.S.*

Bedford Pumps provided early contractor involvement (ECI) during the initial conceptual design stage back in 2005, and during the outline design and performance specification development stage following the scheme approval in 2007.

The four original Storm Pumps were each driven by 1800 hp diesel engines and pumped a nominal 19.8m<sup>3</sup>/s per pump. The Storm Pumps were operated only in high flow conditions. The team were very keen to adopt electric pumps rather than the diesel units currently installed. There were a number of drivers affecting this decision, namely: the energy

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## Altmouth Pumping Station (continued from page 1)

consumption and carbon dioxide emissions would be significantly less than the existing plant; greater flexibility would be gained over the control of the river also resulting in further efficiency gains; and the station could be fully automated.

A number of different pumping configurations were considered during the outline design stage including replacing the existing Vickers pumps with three Storm Pumps operating at 15m<sup>3</sup>/s each at approximately 4.7m head. Bedford Pumps made a significant contribution to the station design by suggesting, and going on to supply, four pumps instead of the three, thus reducing the total head from 4.7m to 4m and subsequently saving 600kW on the installed power. The addition of a fourth pump would reduce the required flow per pump to 11.25m<sup>3</sup>/s.

Bedford Pumps proposal, which was subsequently accepted, was for canister units instead of conventional lineshaft units, which reduced the capital cost, improved health and safety conditions, increased efficiency and gave more available floor space. Bedford Pumps designed and manufactured a revolutionary variant to a standard submersible. These pumps are bespoke and unique, driven by 620 kW 3.3kV motors and incorporating an integral IP68 planetary gearbox within the unit, thus enabling the motors to be a 6-pole rather than a much larger 26-pole motor that would have been required for a direct drive pumpset.

In addition to the four Storm Pumps, which combined can pump 45m<sup>3</sup>/s of water, Bedford Pumps also supplied the Dry Weather Flow pumps for the more routine operation of the pumping station. Under a modified control philosophy to operate at the greatest efficiency the pumping station will follow two modes of operation, the Dry Weather Mode and the Storm Mode. The DWF pumps will be brought online if the upstream level of the river local to the pumping station becomes too high. The Storm Pumps will only be used if the channel level continues to rise and high flows are detected in the upper catchment.

The contract to Bedford Pumps was for the complete M & E package to replace the pumps and MCC at a total out-turn cost in excess of £4M. The full scope included:

- Pumps with high efficiency motors
- Integral gearbox
- Canisters
- 11kV and 415v transformers
- 11 kV switchgear
- Auto Transformer Starters
- Low Voltage switchgear
- Cabling & Instrumentation
- Removal of existing plant
- Installation & Commissioning



*Original diesel engine driving the pumps*

The works contract was awarded to Bedford Pumps in August 2009 and has reached completion on target in September 2011.

John Hunt, Regional MEICA Engineer for the Environment Agency, said “We chose Bedford Pumps because they were able to retrofit the new plant into the existing civil structure, provided plant that can be installed and removed readily, and could use the existing station overhead crane. The pumps that Bedford offered were very different to the ones that were previously installed but were significantly more efficient.”

“Bedford Pumps were innovative with the pump design. They took a lot of design elements of various pumps and combined them into one unit which was very cost effective. It also allowed us to pump the water within the limitations of the power supply that was available at the site.”



*Pump installation at Altmouth Pumping Station*

For further information on this or any other of our applications please contact our Sales Team at:

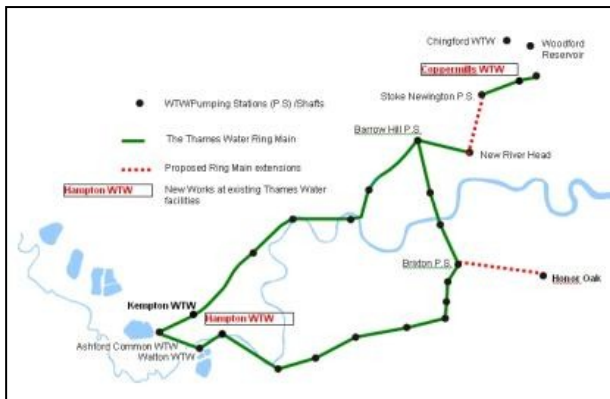
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# Bedford Pumps' dual pumping system secures drinking water for London

Bedford Pumps Ltd, in partnership with Morgan Sindall, has recently completed an extensive project which forms part of a £150M improvement to the Thames Water London Ring Main system.

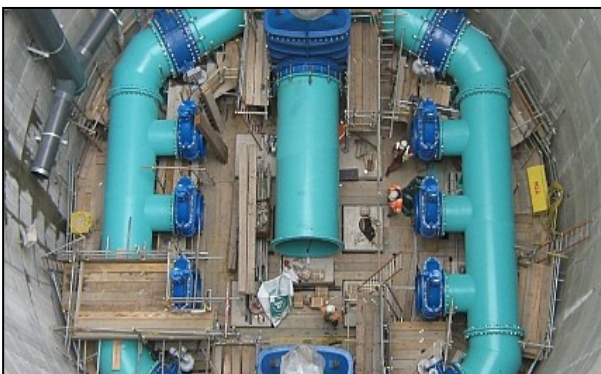
The Thames Water Ring Main (TWRM) formerly known as the London Water Ring Main, is a major part of London's water supply infrastructure. The initial ring, 80 km long and 45 m below ground level, was constructed between 1988 and 1993 and has recently been extended to the North and South of London.



*The Thames Water Ring Main*

The TWRM forms a complete circuit around the main water supply zones in London and was designed in order to improve the speed and efficiency of transferring potable water. Since the mid 19<sup>th</sup> century London's drinking water was pumped from a Water Treatment Works to the West and North-East of the city. This was prohibitively expensive and no longer economically viable due to the expanding population. The radical solution was to tunnel around London, linking Transfer Pump Shafts with Water Treatment Works and Pumping Stations along the route.

Bedford Pumps' recent involvement in this project was part of a £12.3M upgrade to the works at Coppermills WTW in Walthamstow, East London. Morgan Sindall were the contractors employed to construct a new Transfer Pump Shaft, and with Bedford Pumps assistance were able to facilitate a 'dual pumping process', from Coppermills to the TWRM and from the TWRM to Coppermills High Lift Pump Station. The Transfer Pump system contained within the shaft was of a highly complex design and Bedford Pumps worked closely with Morgan Sindall and Mott MacDonald to ensure it satisfied Thames Waters rigorous performance criteria.



*Coppermills WTW*

The new shaft, measuring 15m in diameter and 30m deep, connects to two existing shafts on the Coppermills site, and is able to pump water in a bi-directional flow as well as providing a gravity route into the TWRM. In normal operation the Pump Station will be capable of delivering 160 Ml/d of potable water into the TWRM.

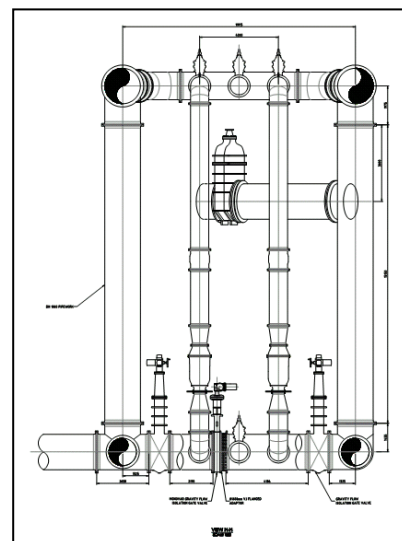


*Coppermills WTW*

Bedford Pumps designed, manufactured and supplied four Submersible Bowl Pumpsets and one Tunnel Drainage Pump. The main Transfer Pumps were mounted in the shaft in a dry well vertical installation and the drainage pump in a horizontal position.

To enable the bi-directional flow of water, the pumps must be able to perform at both a primary and secondary duty. The performance of the pumps at the primary duty point (to TWRM) will give a flow rate of 926 l/s at a head of 3.7m. At the secondary duty point (to Coppermills) a flow of 724 l/s with a head of 10.7m must be achieved.

To comply with the stringent regulations for pumping potable water all materials had to comply with Regulation 31 of the Water Supply (Water Quality) Regulations. Bedford Pumps Ltd use their own "Royal Purple" barrier fluid which has passed the test on the effect on water quality under the Water Regulation Advisory Scheme (WRAS) and has been approved for use with drinking water under the Water Fittings By-Laws Scheme (WFBS).



*Station Arrangement*



## Bedford Pumps upgrade Ashton Avenue for Wessex Water

Bedford Pumps Ltd has contributed to an extensive refurbishment at Ashton Avenue Sewage Pumping Station, one of Wessex Water's largest and most critical pumping stations in the Bristol region.

The station was originally commissioned in 1970 and was targeted for renovation by Wessex Water due to pressure put upon the site by a rising population. This resulted in unsatisfactory intermittent discharges of diluted sewage from the sewerage network occurring during and after heavy rainfall.

£9.5M has been spent on upgrading Ashton Avenue and reducing the risk of flooding in South Bristol. During times of heavy rainfall a greater amount of stormwater can now be safely taken away from homes in the area.

Bedford Pumps manufactured and installed three Storm Pumps and two Dry Weather Flow (DWF) pumps for Ashton Avenue and also refurbished three of the existing DWF pumps previously installed by Bedford Pumps back in 1994. One of the new DWF pumps replaces the original W H Allen pump from when the station was first constructed. W H Allen, were the company that facilitated the existence of Bedford Pumps. BPL was founded in 1987 by members of the former Pump Department at NEI (W H Allen) after the company closed their manufacturing plant within the town.

Bedford Pumps worked in close collaboration with the main contractor and Wessex Water to undertake the refurbishment of the DWF pumps. The DWF pumps serve to lift the foul sewage up into the Southern Foul Water Interceptor for onward flow to Avonmouth STW for treatment. They are each required to pump up to 650 l/s with a guaranteed head of 6.4m.

The three new Storm Pumps are Mixed-Flow Canister Pumps with submerged motors. Each



*Bedford Pumps' Storm Pump for Ashton Avenue*

pump is rated at 2,625 l/s at a total head of 11.8m, 440 kW, complete with Variable Speed Drives. They replace the original Storm Pumps from 1970 which were shaft-driven, axial flow with the motors at ground level.

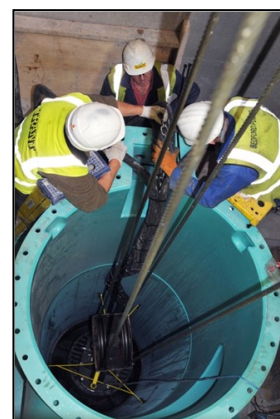
Bedford Pumps also supplied Pump Condition Monitors and Canisters for the Storm Pumps. Air release valves are included on the top of each canister and Bedford Pumps innovative "Latch Lift" system ensures speed, efficiency and cost savings when accessing the pumps.

Mark Lloyds, Project Manager for Wessex Water stated that "During the design stage of the scheme it became apparent that Bedford Pumps were one of only two likely suppliers for these pumps. Being a proven manufacturer of large pumps and the supplier of the original pumps gave Bedford Pumps additional credibility and

they were selected through a competitive tender process.

Bedford Pumps worked closely with B&V on the integrated design and it has proven to be a successful contract all round."

Bedford Pumps are delighted to have been part of such a worthy project which was completed ahead of schedule and under the original budget.



*Pump installation at Ashton Avenue*

For further information on this or any other of our applications please contact our Sales Team at:  
[sales@bedfordpumps.co.uk](mailto:sales@bedfordpumps.co.uk)  
or tel: + 44 (0) 1234 852071

## Minister for Agriculture opens Haddenham Pumping Station

Bedford Pumps were delighted to attend the official opening of Haddenham Pumping Station by Jim Paice, MP, Minister of State for Agriculture and Food.

The new pumping station cost £1.7M and is operated by Haddenham Level Drainage Commissioners. It will drain over 7,500 acres of surrounding farmland. Bedford Pumps undertook the full M & E installation and supplied three of their Axial Flow pump sets with

Siphon Breaker Valves, each capable of draining 60 tonnes of water per minute.



*Bedford Pumps' Axial Flow pumps*



*Commemorative plaque at Haddenham Pumping Station.*

