

A photograph of a person in a wheelchair being assisted by another person outdoors. The person in the wheelchair is wearing a dark jacket and a blue hood. The person assisting them is wearing a blue puffer jacket and a light-colored knit hat. They are standing on a paved path with grass on either side. The background is slightly blurred, showing other people in the distance. The overall tone is blue and somewhat somber.

Targeting ZERO Legionella: Care Home

4i Water Services is a water treatment company that specialises in finding cost effective engineering solutions, to help our Clients provide a safe working environment for all.

Since working with 4i Water Services, **we've managed to successfully remove the Legionella risk and reduce compliance costs**, providing a safer environment for our patients and staff alike.

Estates Manager — Care Home



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The **Challenge**

Introduction

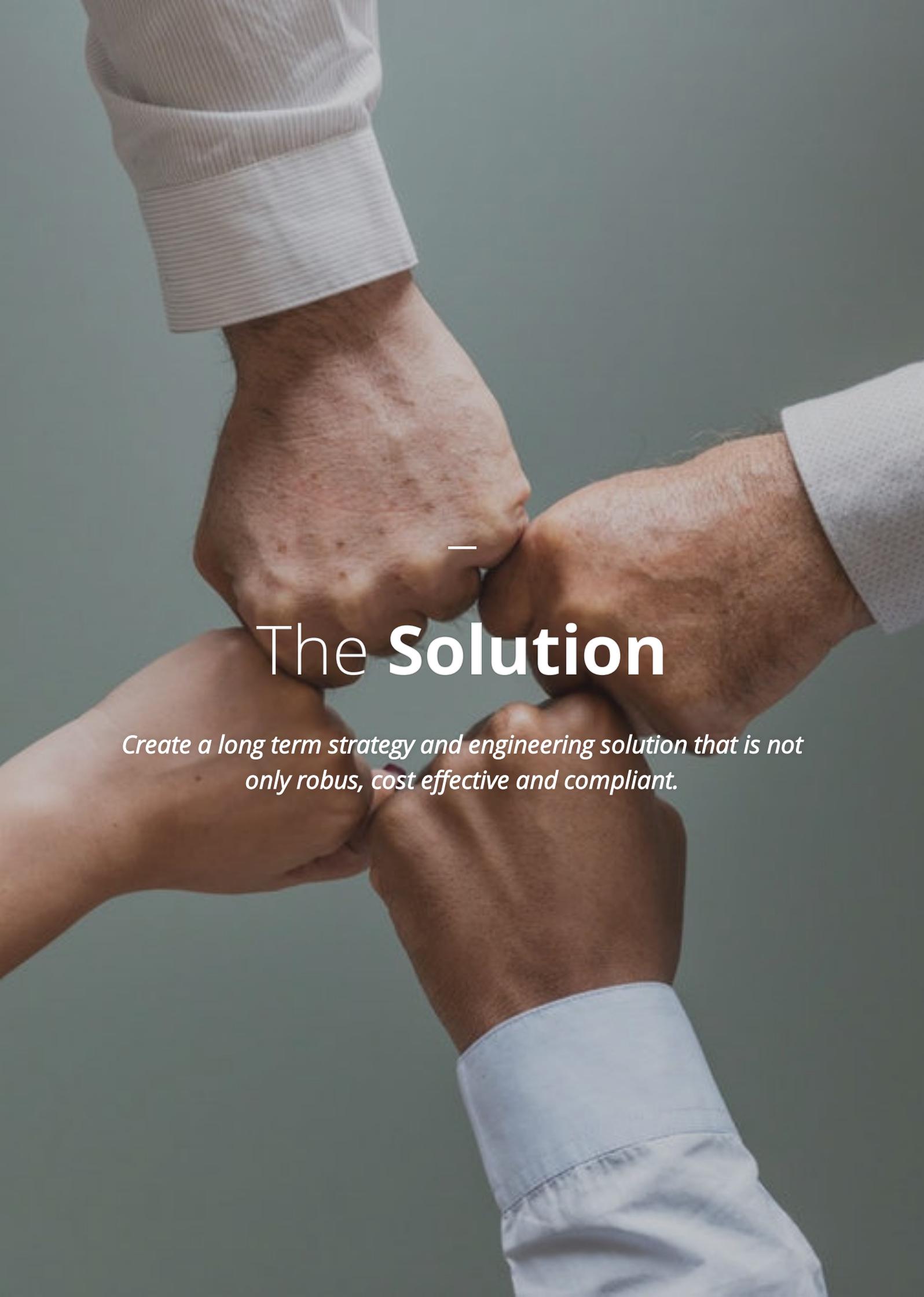
Care Home A is a large private hospital in Widness. As such it is bound to comply not only with the approved code of practice.

Problems arose when, during the routine *Legionella Species* undertaken as part of the water safety groups compliance practice. High levels of legionella (+ 10000cfu) were found in the system.

The hot water temperature was increased from 60°C to 72°C. Adding to this a high level disinfection was carried out on site and the outlets resampled. The results came back and the levels of Legionella was higher than the initial sampling by 2000cfu.

Considerations

- Patients groups varied from minor or low Legionella risk to high risk patients.
- Site engineering levels already stretched.
- Fairly large Care Home with a mixture of old and new pipework, inaccessible deadlegs and deadends stretched over separate sites six sites.
- Solution had to be safe, robust and easily monitored.
- Cost effective as budgets were strained.



The **Solution**

Create a long term strategy and engineering solution that is not only robust, cost effective and compliant.

4i Water Services considered various water treatment methodologies.

- UV is an excellent method of disinfection but requires pre-filtration and has no residual. Since the problems were coming from colonisation post-mains within the system, in order to be effective, UV would have to be installed on all the outlets. This was cost-prohibitive
- Ozonolysis, an excellent method of disinfection, ozonolysis is a very effective disinfecting agent in very dirty situations with a residual for direct real time measurement. However, it is also quite expensive to run the electrical generation plant and the aggressive oxidising nature of ozone was expected to drastically shorten the life of the system.
- End of Line (EOL) or Point of Use (POU) Filtration. This can reduce bacteria results in water sent to patients to zero but does not address the problem. The bacteria remain in the system, so it is a technology to reduce exposure rather than fundamentally reduce the possible harm
- Chlorine dioxide. When produced in sufficiently high purity chlorine dioxide is an online potable biocide, meaning that it can be dosed directly into drinking water. Stringent limits on total oxidants are set by the Drinking Water Inspectorate, so any potential chlorine dioxide unit must be able to ensure that the total chlorine dioxide, chlorites and chlorates produced as by-products of its generation remain below 0.5 mg/L. Chlorine Dioxide is a more effective biocide than chlorine, requires less contact time to achieve disinfection.

The final approach was deemed as the most appropriate. Installing a **Februus MEDI-Sentinel** water purification system, a chlorine dioxide unit specifically designed to cope with the high flow rates and water usage of the clinical setting.

- The **Februus MEDI-Sentinel** has engineered out issues that have caused low yields and poor dosing in the past:
- Remotely monitored and operated, this means that onsite and offsite personnel can be alerted to problems or check the operation of the unit through a smartphone app
- Highly accurate water meter 99.998% this means that rather than dosing 50 mg/100L like a K100 mechanical water meter, it doses 0.5 mg/L avoiding the issues of “slugs” of treated and untreated water.
- High purity dosing of chlorine dioxide this means that the chemical is used efficiently and the customer is not paying for waste.
- Safe, robust and easily maintainable system with proven ClO₂ delivery.
- BMS Link-up option to manage other plant through our PLC Operating System, this can be used as another safety measure, or as a control, putting control into the site managers hands
- DWI-Approved method of continuous disinfection of drinking water which ensures statutory compliance

- BS 8558:2011 Approved method of continuous disinfection which ensures compliance with the approved code of conduct
- Water authority approved installations which ensure compliance with the Water Supply Regulations (1999).

Monitoring the Sollution

Along with the dosing system a monitoring regime was put in place to ensure efficacy as detailed below.

Frequency	Task
Daily	CDU dosing equipment and physical check on chemical levels – confirm against PLC readings
Weekly	Remote monitoring report to be sent to Estates Manager showing water usage, stock and dosing levels – checked against onsite engineers reports
Weekly	CLO2 testing tank and sentinel points on both hot and cold services
Monthly	Random Legionella and Psudomonas Sampling
Monthly	12% of outlet sampled for CIO2 levels
Quarterly	Review results with 4iWS and Estates Team



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The Results

After running the system for 12 months, the increase in both Legionella and Pseudomonas sampling as well as the Chlorine Dioxide the results have been as follows:

Chlorine Dioxide:

These samples were carried out by both 4i Water Services and the site maintenance staff.

The vast majority of samples fell into the 0.1-0.5 ppm range. This means that no overdosing took place and underdosing took place on only three per cent of samples in 12 months achieving a correct dosing rate 100% of the time.

Legionella:

Random legionella samples were taken according to the latest standards in microbiological sampling and sent to a UKAS laboratory for culturing and analysis over a 12 month period. Not one sample showed the detection of *legionella spp.* The first round of clear results came three days after the dosing unit was installed. All subsequent sampling results came back clear.

Cost

The site had an annual spend of:

- Remedial works carried out by incumbent water treatment provider - £42,000-00
- Further remedial works recommended - £22,400-00
- Total cost of £64,400-00

4i Water Services supplied:

- One Februs Medi Sentinal Chlorine Dioxide dosing systems.
- One purpose built chemical dosing storage shed to supply all six sites.
- Training and test kit to measure the performance of the system.
- 24/7 remote monitoring of water usage, chemical usage and dosing levels.
- Chemical, servicing and maintenance on both systems.
- Initial cost of £24,000-00 per annum.
- Ongoing maintenance and chemical costs in the region of £3000-00 per annum

Due to efficacy of Februs Medi Sentinal dosing system, there has been no need to carry out any high level disinfections since. The site staff and patients are now benefiting from a clean and safe water system.

Conclusion

When faced with old buildings with various pipework configurations, inaccessible deadlegs and deadends this was always going to be a difficult problem to solve. This was made even more difficult due to the nature of high risk patients within the hospital.

The Februs Medi Sentinal Dosing System has proven to be reliable, robust, cost effective chlorine dioxide disinfection system.

The results broken down:

- Chlorine dioxide samples were taken over a 12 month period. Less than 3% fell under the recommended 0.1ppm while zero fell over 0.5ppm.
- Legionella samples taken - zero positives.
- Pseudomonas samples taken - <1% positive on the pre samples (all under 10cfu) and zero on the post samples.

Following on from the success of this unit's performance the Group have installed 12 further units across its portfolio of high risk sites. All the high risk sites have shown similar results in reductions of both positive samples and emergency disinfections.

Discover how other companies
succeed with 4i Water Services

Healthcare | Education | Industrial | Commercial



We're Ready!

If you have a compliance challenge we'd love to hear from you — so let's continue the conversation.

CONTACT: 01359 242000

EMAIL: info@4iwaterservices.co.uk

WEB: www.4iwaterservices.co.uk