POWERSYSTEMS
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NHS

CASE STUDY 15506

Royal United Hospitals Bath

NHS Foundation Trust

The Royal United Hospitals (RUH) background:

The Royal United Hospitals (RUH) is a major acute-care hospital, located in Bath, England, approximately 1.5 miles west of the city centre. With 565 beds. occupying a 52 acres site, it is the area's major accident and emergency hospital with it's own helicopter landing point. The hospital is operated by the Royal United Hospitals Bath NHS Foundation Trust.

Its name is taken from the union of the Bath Casualty Hospital founded in 1788 and the Bath City Dispensary and Infirmary founded in 1792.

The combined institution opened in a building designed by John Pinch the elder in Beau Street as the Bath United Hospitals in 1826. It was awarded the title Royal by Queen Victoria in 1864 when a new wing, named the Albert Wing after the recently deceased Prince Consort, opened. This building was later occupied by Bath College.

The hospital moved to its present site, Combe Park, on 11 December 1932. The site had previously been used for the large First World War *Bath War Hospital*, which opened in 1916. In November 1919, it was renamed the *Bath Ministry of Pensions Hospital*, which it remained until it closed in 1929.

In 1959, the hospital absorbed the *Ear Nose and Throat Hospital* and in 1973, the *Bath Eye Infirmary*, both located elsewhere in Bath.

In July 2011, the Dyson Centre for neonatal care opened for premature babies. Over half of the £6.1 million cost was raised by the hospital's charity, the Forever Friends Appeal.

In 2015 and 2016, some services were transferred from the Royal National Hospital for Rheumatic Diseases to the RUH, including endoscopy and children's services, following that hospital's takeover by the RUH Trust. Construction started on a dedicated building at the RUH site in November 2017. It is planned that the last rheumatic diseases services will be transferred to the RUH site by autumn 2019.

In 2008, plans were revealed for a £100 million redevelopment of the pre-Second World War RUH North buildings, which would include an increase in single-occupancy rooms in line with Government targets. In 2014, a five-year £110 million development plan was confirmed. The development will include a new cancer centre, pharmacy, integrated therapies unit, pathology block, IT centre and 400 extra public car parking spaces.

500 THOUSAND £ | 2 MONTHS | SERVICES HV LV | ENERGY SECTOR NHS

The Royal United Hospitals (RUH):

Powersystems has delivered the practical works for the design, supply, installation, testing and commissioning for the electrical infrastructure for a new radiology and therapies power supply at The Royal United Hospitals, Bath.

Project facts and figures:

- 2 new substations were integrated into the existing 6.6 kV HV system to support the LV network extension of the Radiology and Therapies Departments
- Each substation is capable of providing approximately 1400A of LV power
- The dual voltage transformers (11kv and 6.6kv) were 1000kva distribution transformers with oil temperature relays and earth fault passage indicators.
- The transformers had close coupled Schneider RN2c-T2/21 200A Ring Main Units complete with VIP 300 protection relays.

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Powersystems Partnerships:

The electrical works was undertaken in partnership with J. Projects (Civils Contractor) and PRW Group (LV Electrical Contractor).

The Royal United Hospitals (RUH) major design considerations:

The main scope of work was to supply, install, test and commission a new sub-station comprising 2 HV ring main units and their close coupled transformers. From the LV side of these transformer supply cables were installed and terminated onto 2 LV switchboards in adjoining rooms. Both switchboards had the facility of essential and non-essential circuits in case of the loss of power.

The reason for this was that the RUH wanted to extend the existing HV ring system to allow for the provision of additional LV circuits to supply future installation of more MRI scanners, CT scanners and x-ray machines.

As space is at a premium on site the new sub-station was to be located between 2 existing buildings and beside a road which had to be open at all times for access for emergency vehicles.

In between the existing buildings, during excavation, it was found that the ground was full with HV cables, LV cables, BT cables, generator cables, Medical gas pipes, storm drainage, foul drainage, heating pipes, steam pipes, water pipes and unfortunately asbestos. There was also an existing standby generator for the adjoining wards and a HV substation which had to be kept in operation at all times.

To enable construction of the new sub-station all of the above services had to be diverted.

The existing HV system is 6.6kv but may be upgraded in the future to 11kv so dual voltage transformers had to be used.

A HV earthing system was installed around the sub-station base and connected into the existing HV earthing system.

Signal cables were installed and terminated between both the RMUs, the earth fault passage indicators and the winding temperature indicators onto a section of the LV switchboard to be included into the existing BMS system.

How Powersystems have helped?

To allow the sub-station base to be constructed 4 existing HV cables had to be diverted away from the new construction area.

In order to carry this out the existing HV system had to be reconfigured to be able to isolate the cable to be diverted. This consisted of moving the existing open point of the system to be at one end of the cable and isolating the other end of the cable at its respective sub-station. The existing system also had to have its CHP throttled back as the operation of the HV system had been altered.

The relevant cable had to be located and exposed to enable it to be isolated, identified, spiked and new cabling jointed onto it to complete the ring. On completion of the diversion the HV system had to be reverted back to its normal operating mode for safety of circuits for the Hospital and the patients. This operation had to be carried out for all 4 cables.

The existing HV cables are a mixture of modern XLPE (Cross-Linked PolyEthylene) cables and older type PILC (Paper Insulated Lead Covered and PICAS (Paper Insulated Corrugated Aluminium Sheath) cables. Each having their own different methods of jointing and terminating. Also the existing phase rotation of the system is anti-clockwise.

We provided advice on the installation and integration of the new HV switchgear into the existing HV system.

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For more information

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