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Supporting our
NHS

Case Study

Royal Papworth Hospital

Static Systems designs, supplies and installs complex site-wide fire alarm and management system at the new Royal Papworth Hospital.

Overview

The new Royal Papworth Hospital in Cambridge is a state-of-the-art specialist heart and lung hospital situated adjacent to Addenbrooke's Hospital and forming part of the Cambridge Biomedical Campus. Skanska, the main contractor on the project, handed over the hospital to the Royal Papworth Hospital NHS Foundation Trust in January 2019. Clinical services moved over from the original hospital during late April/early May 2019.

The new hospital features:

- Five operating theatres, five catheter laboratories and two hybrid theatres
- 14 isolation rooms
- Six inpatient wards
- Approximately 300 single beds, plus a 46-bed critical care unit and 24 day beds – most of which are en-suite individual rooms
- A centrally located Outpatients Unit offering a wide range of diagnostic and treatment facilities
- A link corridor to Addenbrooke's Hospital
- An atrium on the ground floor with a restaurant, coffee shop and convenience store

Our challenge

The hospital building is oval in design and has five storeys and a roof area. The ground floor incorporates the main entrance, ambulance entrance, the hospital's restaurant and multi-faith rooms.

Critical Care, Theatres and Cath Labs are located on the first floor. The main ward areas are located on levels three to five, split into north and south on each level. Plant rooms are at second floor, roof and basement, and there is also a separate remote energy centre which houses the hospital's boilers, CHP, Ground Source Heat pumps, electrical transformers and generators and acts as an entry point for all the services coming into the hospital.

The new hospital has a particularly interesting fire alarm and management system with 15 networked fire alarm panels and in



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Chris Smith Head of Project Delivery at Static Systems.

excess of 4,000 addressable devices, including 1,900 detectors. The system was designed, supplied and installed by Static Systems Group, and overseen by Skanska's appointed building services engineers, Troup Bywaters + Anders (TB+A) who also set the outline brief.

The merits of early engagement and supply chain collaboration

When working on a new build project of this scale, early engagement and close collaboration with all parties involved in the design and supply of the fire engineering systems are essential to its success. In the case of the new Royal Papworth Hospital, those suppliers responsible for the fire alarm, building management systems, damper and duct work worked closely together from the outset. ▶



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During the design process, for example, frequently project meetings were held on site where representatives of the suppliers came together with Skanska's construction team and TB+A to discuss design issues and integration requirements.

Early engagement made a huge difference to the progress of the project. Our early engagement working alongside TB+A and the whole design team through the reconstruction phase meant we could provide detailed advice on our system rather than a generic product being built into the scheme at a very early stage. This meant that by the time we started construction we already had a robust design. Other than fine tuning, the design work was complete well before the groundwork of the building had been finished.

Having worked on a significant number of healthcare projects in the past, we can honestly say that we've never known a Trust to be as involved as they were in this particular project. From the very early stages of design through to operational requirements and detailed zone labeling requirements, the Trust was happy to engage on all matters.

System interfacing

One of the biggest challenges Static Systems had to address during the design process was the significant requirement for the site-wide fire alarm system to interface with different systems – including the dampers, air handling plants and smoke extractors – in order to provide a completely integrated system that manages the air flow and smoke extraction to safely direct smoke throughout the building.

Static Systems developed the fire alarm cause and effect, incorporating the damper operation, of which there are several hundred. By closing the dampers they act as a barrier in the duct work and contain the fire by stopping fire or smoke spreading. Then, once the fire is extinguished or is being managed, the fire brigade can, if required, open the smoke dampers via the control panel to safely extract the smoke. All of this required in-depth consultation with TB+A and the different suppliers involved.

With different systems and equipment being installed simultaneously, there was a significant amount of co-ordination required to ensure they would interface together. We also needed to understand where they were being installed and how they were being fitted to ensure there were no physical clashes of equipment and materials.



The new Royal Papworth Hospital was a challenging and really interesting project to be involved in, particularly given the need for the high level of interfacing between the different elements of the fire engineering systems. Close collaboration between the Trust, Skanska, ourselves and the equipment suppliers definitely played a key role in the successful development and installation of the system."

"All parties were very willing to collaborate so meetings were really productive and everyone was up to speed on progress and able to quickly address any design challenges. With everyone on board from the outset and in regular contact throughout the design phases, there was no repetition of work and we could be sure that the finished product would deliver what the original design intended."

Terry Canty, partner at Troup Bywaters + Anders



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Royal Papworth Hospital's fire alarm system also interfaces with other equipment throughout the hospital, including the security, nurse call and sprinkler systems.

The security system at Royal Papworth integrates with the fire alarm devices. To maintain security integrity, certain more sensitive areas have different operations in the event of a fire condition.

The fire alarm system also interfaces with the nurse call system, which was also designed, supplied and installed by Static Systems in much the same way as the fire alarms. In the event of a fire, fire messages are displayed on the nurse call indicators, providing supplementary information to nurses.

Royal Papworth Hospital's whole-site sprinkler system also interfaces with the fire alarm system. Static Systems designed the fire system so that it would pick up signals from the sprinklers' flow switches and display this information on a PC-based display screen which was designed specifically for this purpose. This screen also captures information on other plant that the sprinkler system monitors, including water and oil tanks. In total, approximately 75 signals are monitored by Static Systems and displayed on the bespoke screen.

Evacuation planning

Evacuation planning was also a key consideration when designing the fire engineered system for the new Royal Papworth Hospital. In the event of a fire, hospitals typically have a phased evacuation process, whereby a fire in a zone would result in the affected zone being evacuated and adjacent areas being given an alert. However, at Royal Papworth Hospital, the Trust wanted to create a bespoke operation when it came to the ward areas. As each ward area went across more than one of the fire zones for the building, the Trust wanted an evacuation process based on the ward areas rather than on the fire zones. Static Systems was able to design the system to meet this requirement.

A reliable, long-term solution

There are other examples where Static Systems integrated other systems to meet the Trust's specific requirements. For example, a disabled refuge system was installed where, in the event of a fire, there are designated places of safety on every level for patients who can't escape via the staircases. The disabled refuge system interfaces with the fire alarm system so that in the event of an alarm, the refuge system is activated. People with mobility issues can then talk to security teams via a call point speaker.

Static Systems also programmed and supplied a PC-based interactive data station for the fire alarm system, enabling maintenance teams to get an overview of the health of the system, obtain information on each of the individual devices and, where required, isolate, add or re-label devices.

Following the installation of the fire engineering system at Royal Papworth Hospital there was a considerable period of testing to ensure that all of the systems met the rigorous criteria of Skanska and its client, Royal Papworth Hospital NHS Foundation Trust. The whole installation and testing period went very well and Royal



The new Royal Papworth Hospital was a challenging project with a large number of interfaces between the various systems. The early involvement of Static Systems in the design and development of the fire alarm system along with their knowledge and experience were key to enable the design team and other specialists to integrate the fire alarm with the other systems such as security, nurse call, BMS and sprinklers.

“This early involvement and collaboration played a crucial role in the successful implementation of all the necessary interfaces, coordination and installation. Static Systems remain involved at Royal Papworth Hospital by providing the reactive and planned maintenance for the system.”

Sean Smith, Senior Project Manager for Skanska

Papworth Hospital's patients, staff and visitors can rest assured that they are protected by a reliable and highly sophisticated system that will have a significant lifespan.

Static Systems continues to be actively involved in the site, providing ongoing system maintenance in partnership with the hospital's facilities management company.



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