Case Study

HMP Five Wells

Project Outline

Client	Ministry of Justice (MoJ)
Location	Wellingborough, England, UK
Sector	Custodial
Disciplines Covered	• Fire Alarm System & Anti-ligature In Cell Detection • In Cell High-Pressure Fixed Misting • High-Pressure Hose Reels • General Alarm • Auditable Cell Call c/w Intercom • Guard Tour • Accessible Toilet & Disabled Refuge • Static & PTZ IP CCTV • Tamper Alarm • Site-Wide Fibre Optic Infrastructure • SMS & Control Room Integration
Key Points of Interest	• 40,000+ metres of pipework & 2904 nozzles • 1,660 Cell Integrated Fixed Misting Systems • 4000 Smoke/Heat Detectors

Project Overview

HMP Five Wells is a new build category C resettlement 'super' prison, located in Northampton. The new generation prison is built with an innovative design to reduce offending behaviour, with the new initiative set to become the established standard for the New Prisons Programme. It will be the most significant operational UK prison costing £253 million to construct.

The new 1600+ occupancy prison stands on the demolished HMP Wellingborough site. It consists of seven separate residential blocks, workshops, educational and healthcare facilities, and a visitors' centre.

The Challenge

The challenge set by the client was to design and install a fully comprehensive, MOJ compliant fire, misting and security package completed to BIM Level 2. A collaboration of Protec Fire and Security Group brands delivered the complete fire and security solution. Protec Fire Detection PLC's dedicated custodial department carried out an element of the electrical works such as fire detection, general alarm, CCTV etc. with Protec Camerfield Ltd (Protec's mechanical fire protection specialists) undertaking the mechanical water mist systems, pump room, fire plantroom package, high-pressure hose reels etc.

The electrical and mechanical teams worked harmoniously with the client's design and construction team through each project stage. They oversaw the complete design and installation process to ensure the systems provided were of a high standard and fully compliant with MoJ (Ministry of Justice) standards and the project brief.

Bringing together our core custodial fire, misting, and cell call products to create a state-of-the-art integrated system. The required fire and security systems included fully integrated high-pressure water mist and fire detection systems, protecting residents from a fire within their cell by automatically misting any detected cell fire. This novel requirement for the residential block required extensive product development of the design and rigorous testing by Protec's in-house R&D department. These systems meet the fire and security industry standard, and custodial specific criteria set out by NOMS (National Offender Management Service), with the MOJ's project-specific specifications.

The project was subject to challenges as with any project, various methods and standards across multiple industries would have to come together to work harmoniously, reducing time on site and money spent. Utilising state of the art technologies and methods would be vital in developing the services as the job progresses. All this would ensure the project was completed on time and in budget.

The Solution

Fire Alarm – The residential, workshop, education, and healthcare blocks feature MOJ & BS 5839 compliant systems.

The BS 5839 L2/M system design consists of over 5000 Protec 6000PLUS addressable devices controlled by a network of 45 Open Protocol 6500 fire alarm panels. The system implements Protec's Algo-Tec® software developed explicitly for prisons to provide a robust and compliant fire detection solution.

In-cell detection systems utilise our ultra-high-performance Optical Heat Carbon Monoxide (OPHTCO) sensors which maximise fire response times while mitigating false alarms. The design incorporates dedicated Protec magnetic anti-ligature multi-criteria detectors to provide safer cell standards.

General Alarm System – These systems in all residential, workshop, education, and healthcare blocks allow staff and residents to call for assistance. Manufactured out of our production facility in the UK, the General Alarm system is compliant with MOJ Specification 011.

A series of anti-vandal call buttons raise the calls, painted RAL6018 (yellow/green) strategically located around each block. Events are managed by local PLC (Programmable Logic Controller) control panels, with each point wired as a dedicated zone. The status of the system displays on each vandal resistant LED indicator zone panel located in staff-controlled areas.

IP CCTV System – An MOJ compliant IP system was designed and installed in both internal and external circulation areas to allow staff to monitor and record resident movement and behaviour from a central control room.

The system was designed by Protec's custodial security team, using Field of View software to provide optimum CCTV coverage of internal circulation spaces and critical rooms. IP and POE anti-vandal cameras are strategically located internally within each block. Wall and column-mounted PTZ (Pan, Tilt, Zoom) cameras were employed externally to dedicated pedestrian routes.

A three layer fibre optic network provided all IP cameras controlling and viewing capabilities from the central control room using a graphic SMS interface and associated interactive monitor wall. With 31-day RAID 5 storage of high-quality resolution (1080P) images, the system provides officers with a robust and interactive solution.

Cell Call System – An MOJ compliant, the auditable system was designed and installed to the seven house blocks and the CaSU (Care & Separation Unit) to allow residents to call for assistance from within their cell. The anti-tamper and vandal-resistant cell call system is designed in-house, with the stainless-steel call plates manufactured by Protec Fire Detection in the UK.

All events are managed locally by the wing officers, who use vandal-resistant control and display panels located on each accommodation level to monitor calls and officer attendances. Each event is time and date stamped, displaying colour rich alphanumeric text on the LCD touch screen.

The system includes duplex speech, allowing direct communication between officers and each resident cell. An 'All Call' facility, broadcasting to all cells, is controlled via the wing control panel and comes as a standard feature.

The cell call also fully integrates with the in-cell misting, providing automatic dosing of a cell fire when the intelligent cell detector records an active fire alarm event. The system also includes officer override

facilities, accessed by a unique i-fob to energise or deactivate the high-pressure misting cell nozzle and incorporated to meet MOJ Specification 054.

Misting System - As a new development of the MoJ Specification, the fire alarm system combines into a fixed high-pressure water system. Designed and manufactured by Protec Camerfield Ltd, the fixed misting solution employed traditional products and installation methods for water misting delivery. Still, with the added fire detection and electronics expertise offered by Protec Fire Detection PLC, working together to provide the fully integrated solution.

Our research and development team developed a well-designed and durable product that meets all the criteria within the relevant specifications for prisons through innovative development and manufacturing processes. Each cell riser was provided with a fixed misting chassis plate that housed all the mechanical and controls for the system. The strict footprint and final position were co-ordinated with other services using Building Information Model (BIM). Utilising BIM ensured chassis plates and detection equipment could be installed in the small spaces. The misting nozzles could be in the correct location while not impeding other works, and acoustic tiles could be fitted without interfering with the spray patterns while remaining compliant without falling out of the standards. The chassis was manufactured off-site at our production facility, who built, tested, and QA checked before being shipped to and from the site in recyclable boxes in a rotation format to reduce waste on-site.

Designed from a concept as a dedicated Fixed Misting solution to meet MOJ Specification 054, the system has now been thoroughly tested and accepted by the MOJ and is a solution that can be applied and adapted to future custodial projects.

The Aftercare

The project was delivered to BIM level 2 and supported by COBIE (Construction Operation Building Information Exchange) data to provide the client with all the required asset information needed for the commissioning and future operation and maintenance of the systems.