FACT FILE
Bedford Greenacre Independent School
Main client: **Bedford Greenacre Independent School**
Architect: **Lungfish Architects**
Main contractor: **Pellikaan Construction**
Steelwork contractor: **H Young Structures**
Steel tonnage: **305t**

Steel goes back to school

The steel frame incorporates a series of interlinked blocks.

The construction of a new independent school in Bedford has reaffirmed that structural steelwork is the framing solution of choice for educational facilities in the UK and Ireland.

Over the years, structural steelwork has proven to be a cost-effective solution for the construction of educational buildings. The material easily provides aesthetically-pleasing, flexible, modern environments in which pupils and students are known to thrive.

Speed of construction is one reason why many designers choose steel, while the material's flexibility and long span qualities, important for sports halls and large common areas, are also important considerations.

A case in point and a recent example of steel's attributes is the construction of the Bedford Greenacre Independent School, which will provide the town with a significant educational boost when it opens in 2025.

The new premises will bring together two of the town's existing establishments – Rushmoor School and St Andrews School – that have been working together for some time.

Being constructed on a 40-acre greenfield site to the north west of Bedford, the new school will be a 680-place all-through (five to 18) school. It will include 80 Sixth Form places and will accommodate all pupils from both schools as well as an additional 120 students.

According to Lungfish Architects, the location of the new school was carefully considered. The site was agricultural, arable land set out across two large fields on the outskirts of Bedford. Sloping in its central section with flatter land at the top and to the western side, the site has heavily influenced the way the school has developed.

Simon Reid, Managing Director at Lungfish Architects, says: "From the start, we ensured that efficiency and adaptability was placed at the heart of our Bedford Greenacre Independent School design concept, which proved particularly advantageous when Pellikaan Construction chose a steel frame structure.

"The steel frame design supports flexible teaching spaces within our design concept, and enables parts of the building to change and adapt as required. These large format areas favoured our design to maximise natural daylight and minimise the need for artificial light where possible, as glazing affording views over the River Great Ouse valley were incorporated into the concept.

"This project is a prime example of how efficiency, adaptability and natural design elements can be included to support tight timescales and we are looking forward to seeing students and staff benefit from the new space."

In order to make the most of the expansive views across the valley, the school buildings are positioned on the upper, flatter part of the site, together with staff car parking and sports pitches. A separate access, pupil and parent car park and drop-off point will be located at the lower end of the site.

Overall, the school consists steel-framed interlinked blocks, known as the junior block, senior block and central specialism block. The northern end of the development, includes an attached sports village and hall.

Working on behalf of the main contractor, H Young Structures, has undertaken a steelwork build and design contract, which included erecting 305t of steelwork for the project.

"One of the advantages of using a steel-framed design has been the fact that the scheme can be developed and adapted right up until we go into fabrication, only a few weeks before commencing on site," says H Young Structures Design Engineer Paul Harvey.

The final steel design is based around a regular 6.2m × 6.2m column grid pattern, with the majority of the school's internal columns located either side of a central corridor.

Some of the corridor partition walls contain stability-giving cross bracings, while further bracings are located in the perimeter walls, in the roof structure and in link stairwell buildings that connect

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the school's different blocks.

On the other hand, walls between classrooms do not contain bracing, giving the steel design some flexibility as these partitions could be removed in the future, if larger rooms were required.

Throughout the project, a composite design has been used for the school's first floor areas, with 350mm-deep steel beams supporting metal decking and a concrete topping.

The ground floor is a concrete slab, poured once the steelwork had been erected. It includes a subterranean basement level, which is approximately 11m-wide, forming a double-height atrium offering views down the adjacent valley.

Positioned at the heart of the school, the atrium is said to have been designed to optimise the natural light, increase natural ventilation, and maximise the views.

Using a single mobile crane, the steel erection programme started at the southern end of the project, with the sports hall being the final piece of the steelwork frame.

The hall is formed with perimeter columns installed at the same 6.2m spacing as the rest of the scheme, and they support a series of 20m-long roof rafters.

Because of their length, the rafters were brought to site in two pieces that were spliced together on the ground before being lifted into place as complete 20m-long sections.

The rafters were pre-cambered for dead load, which also kept their weight down, making the steelwork package even more cost-effective.

Externally, great consideration has been given to the overall appearance of the school, paying interest to the lines of sight into and out of the site from the neighbouring residential settlement.

According to the architects, alongside the specialist and rural nature of the site, significant landscaping will be made to ensure that the external grounds and sporting needs of a 680-place school that holds excellent sporting credentials are met.

With that in mind, a flat area has been set aside for the development of grass pitches for rugby and football, a running track, a 3G sports pitch and multi-use games area (MUGA), all in accordance with Sport England requirements.

Summing up, School Principal Ian Daniel, says: "The plans for the new site are very exciting for our students and we are looking forward to having more playground and sports space around us for them to enjoy, together with modern classrooms that are environmentally friendlier."

"We're moving from two urban settings to a semi-rural setting, which is spectacular and will provide a really vibrant environment for teaching and learning.

"The location is first class and it will be a wonderful environment for teaching and learning. The School also plans to allow community use of our facilities to provide opportunities for other children and adults in Bedfordshire." ■

The school buildings are at the top of a sloping site, allowing views over the nearby river valley.

The sports hall was the final steel element to be erected.

Cross bracings are located in and around stairwells.