

# Steel by design

## FACT FILE

### Leeds City Academy

Main client: White Rose Academies Trust

Architect: Watson Batty Architects

Main contractor:

Morgan Sindall Construction

Structural engineer: Adept Consulting

Steelwork contractor: Shipley Structures

Steel tonnage: 63t

Structural steelwork is helping the Leeds City Academy to expand its premises with a teaching block extension and an enlarged dining hall.

Choosing a steel-framed solution for any construction project is the result of numerous design choices and decisions. The length of the required internal spans, vibration, flexibility and adaptability, as well as the speed of the construction programme are all crucial.

For education projects, all of those criteria are important, with the last one perhaps the most vital, as a quick delivery will result in less disruption, which is particularly pertinent when the building work is taking place adjacent to an existing and 'live' school.

This is the case at the Leeds City Academy, where structural steelwork is being used to expand the school's facilities.

Run by the White Rose Academies Trust, the academy's current school buildings are being enlarged in order to accommodate more pupils, as student numbers are predicted to increase within the catchment area. To this end, a two-storey teaching block extension is under construction, while earlier in the programme, the existing dining hall was enlarged with a two-bay add-on.

Although the dining hall was completed during the summer break when the school was shut, the remainder of the works had to be carried out during term times. This required careful coordination to minimise disruption to the functioning academy.

As the extension is located to the rear of the existing school premises, the site has its own access route, and entrance, which is separate to the one used by staff and pupils. This has lessened the impact on the school, although deliveries are still not permissible during early mornings and late afternoons when pupils are arriving and leaving the academy.

"Logistics is one of the main challenges on this project, especially manoeuvring large pieces of equipment, such as a piling rig and a mobile crane, around the access route," says Morgan Sindall Construction Project Manager, Richard Bowmer.

One of the benefits of using steelwork is that it is prefabricated offsite and consequently the material requires fewer deliveries, compared to other framing solutions. This is particularly useful when working on a confined site, like this one.

Steelwork is also designed and fabricated in a

bespoke fashion for each individual job and on this scheme, none of the steel beams or columns are longer than 10m, which has also made deliveries a little easier.

As well as constructing the site's access route, early works on this scheme also included the installation of piled foundations to support the new steel frame. Once the piling rig had been successfully manoeuvred onto the site, it installed a series of piles to a depth of 10m.

Each pile supports and connects to one column via a series of holding down bolts. The columns are arranged around a regular grid pattern, which is the same for both floors of the extension. Perimeter columns are spaced at 6m intervals, while internally, there are two 8m-wide spans for two rows of classrooms, which are separated by a 3m-wide central corridor.

Accommodated in the extension's two floors are 11 general teaching rooms, one science studio, a science lab, music room, music practice room and two group rooms.

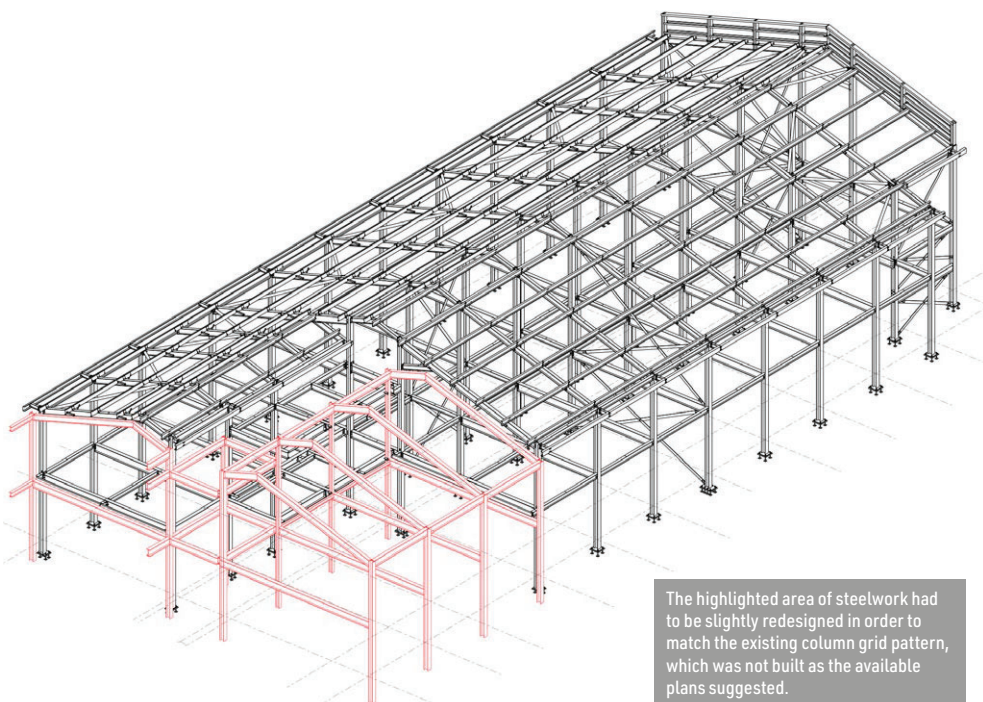
Flexibility is an important factor and it has been designed into the scheme. The braced frame



The extension consists of a central corridor with classrooms positioned either side.



The extension is located to the rear of the existing school and has its own access route for the delivery of materials.



The highlighted area of steelwork had to be slightly redesigned in order to match the existing column grid pattern, which was not built as the available plans suggested.

has its cross bracings located at the gable end of the building, and in the corridor and staircase walls. This leaves the class room partitions free of bracings, which provides the option of removing the walls in the future, if the school wanted to reconfigure the extension.

The first-floor of the extension has been formed with steel beams supporting metal decking and a concrete topping to form a composite solution.

As part of its package, which included fabricating, supplying and erecting the steelwork, Shipley Structures also installed the extension's precast stairs and landed the metal decking packs onto the first floor beams in preparation for their installation.

Continuity has also played a part in the project as the existing school buildings are steel-framed. One end of the new extension links into these buildings at ground and first floor, which posed an additional challenge.

Although the extension abuts the existing building and is structurally-independent, the corridor links meant new steel columns had to align with existing steel members to provide seamless passageways.

Another benefit of using a steel-framed option is the fact that steel members can be re-designed at the last minute, with little or no disruption to the overall construction programme.

Working on a design provided by project engineers Adept Consulting, Shipley Structures designed the steel connections and this part had to be altered after an on-site inspection of the school buildings.

"It was discovered that the existing steel frame was not built exactly as the original drawings indicated," explains Shipley Structures Contracts Manager, Jack Coates. "Some columns were not in the location we expected them to be and so our steelwork layout and the connections for the link area had to be redesigned to suit the existing building's grid."

Fortunately, this unexpected challenge did not impinge on the programme and the entire steelwork erection was still completed on schedule by early September.

With the frame up, external and internal works have begun. The extension is being clad with bricks of a similar hue to the older buildings, while the pitched roof design also mimics the adjacent structures. This creates an extension that will sit comfortably within its surroundings.

The extension is due to be complete by August 2025, in time for the autumn term. Once students and staff have taken possession of their new facilities, an adjacent temporary teaching block will be removed, freeing up space for Morgan Sindall to complete its work that includes resurfacing the playground and installing netball courts. ■