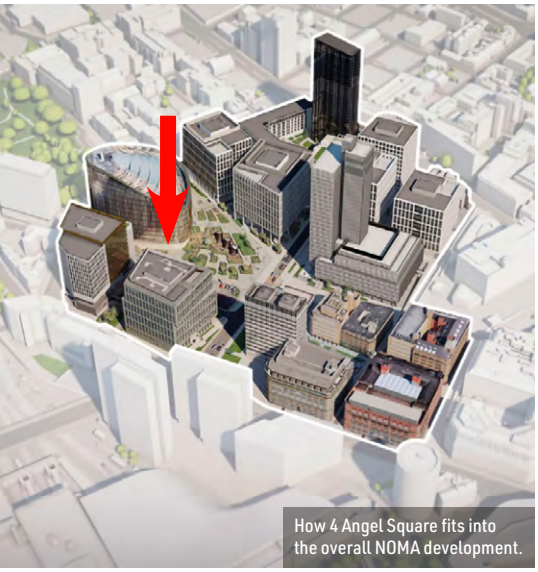
Carbon neutral means Excellence

Sustainability is at the heart of the NOMA mixed-use scheme in Manchester as the latest steel-framed office development is aiming for a BREEAM 'Excellent' rating.

Located in the north of Manchester city centre, NOMA is a multi-million-pound mixed-use development and one of the largest in North West England.

Situated close to Manchester Victoria station, the eight-hectare scheme is revitalising the area with the creation of more than 400,000m² of office, residential, retail, leisure and hotel space.



How 4 Angel Square fits into the overall NOMA development.

Steel construction has played a major role in the overall scheme as a number of NOMA's buildings are steel-framed structures, such as the latest development, 4 Angel Square. This is an 11-storey office block, offering more than 22,000m² of Grade A office space and aiming to achieve a BREEAM 'Excellent' rating.

Interestingly, the project sits directly opposite the steel-framed One Angel Square, which completed in 2012 and was the first office building to achieve a BREEAM 'Outstanding' accreditation (see *NSC* March 2013).

Accommodating the Co-op headquarters, the building was heralded as a sustainable landmark as it also achieved an A+Energy Performance Certificate and a Display Energy Certificate A for operational standards.

Continuing NOMA's high sustainability credentials, developer MEPC says 4 Angel Square will be a carbon-neutral office block with an EPC A rating and space to house around 2,000 workers.

MEPC Head of Development Paul Pavia says: "With widespread public and business support for a true 'green recovery' after the pandemic is over, we expect occupier and investor demand for quality, sustainable workspace to grow further, which is why we have committed to making 4 Angel Square operationally net zero-carbon and raising the standard for sustainable office development.

"The building will help drive Manchester's recovery and support the city's long-term growth by creating high quality employment space designed to appeal to major occupiers and support thousands of jobs."

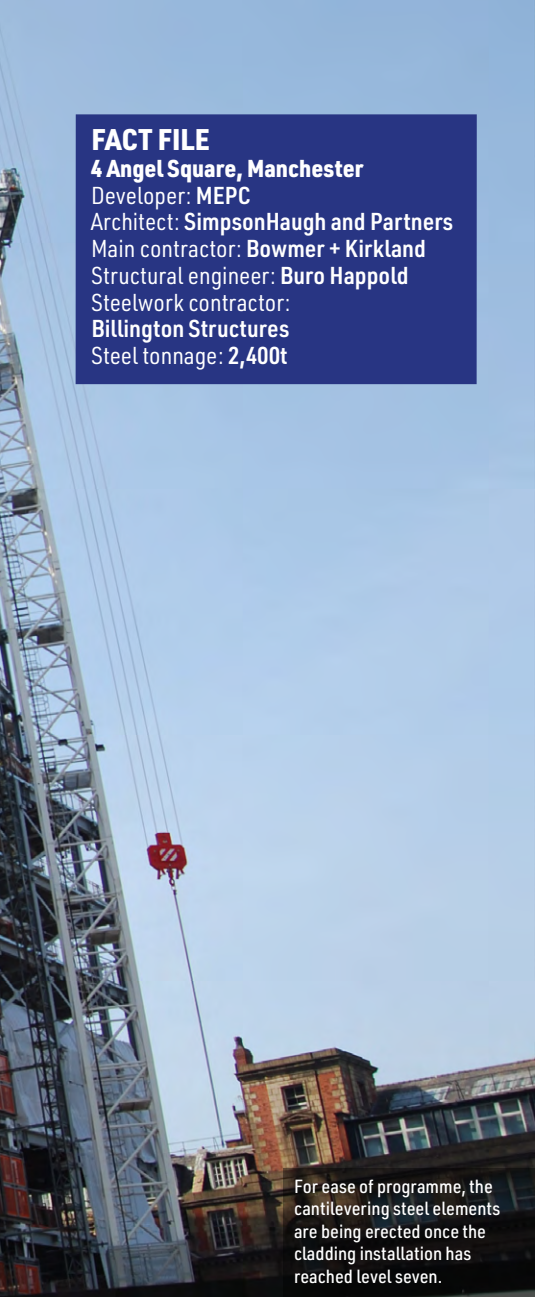
Designed by SimpsonHaugh architects, the steel-framed structure is set around a centrally-positioned concrete core that helps maximise the extent of clear span floor space, while also allowing greater penetration of sunlight.

The steelwork is based around a regular 8m perimeter column spacing, with internal spans of up 18m-long. Most of the beams are fabricated plate girders with bespoke web openings for the building's services. The beams support metal decking and a concrete topping to form a composite flooring solution.

Adding some architectural drama and creating a stand-out landmark building, 4 Angel Square is not a regular straightforward structure. Instead, it is split into two blocks, with the upper four floorplates shifting around a central pivot point.

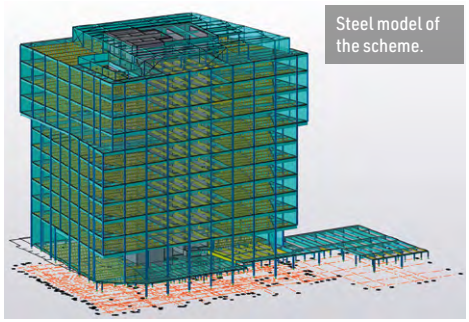
Looking up at the building, the structure gives the impression of a square box where the upper

FACT FILE
4 Angel Square, Manchester
Developer: **MEPC**
Architect: **SimpsonHaugh and Partners**
Main contractor: **Bowmer + Kirkland**
Structural engineer: **Buro Happold**
Steelwork contractor: **Billington Structures**
Steel tonnage: **2,400t**

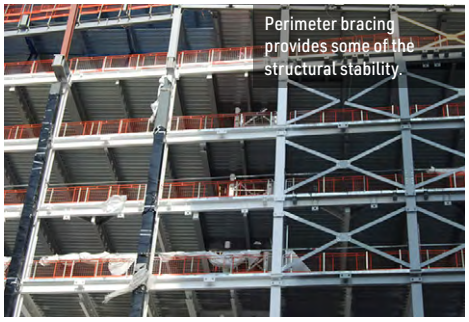


For ease of programme, the cantilevering steel elements are being erected once the cladding installation has reached level seven.

Visualisation showing one of the building's cantilevering corners.



Steel model of the scheme.



Perimeter bracing provides some of the structural stability.

Most of the project's structural steelwork has been erected by the site's tower crane.

portion has been slightly unscrewed.

The upper block is said to respond to city views towards Victoria Station and the structure's 'twist' forms a couple of 3.5m-wide corner cantilevers at seventh floor. Correspondingly, the opposite corners of the building have two corner recesses on the same floor, creating terraces.

The first bays of steel on the elevations adjacent to the corner cantilevers form full-height Vierendeel girders that control deflection of the cantilevered zone and allow installation of the cladding system. However, due to the desired construction sequence, the cantilevering overhang steelwork was not erected at the same time as the rest of the seventh-floor steel.

The design requires all of the concrete cladding panels to be fixed to the columns up to level seven, before this steelwork is installed. This will require steelwork contractor Billington Structures to commence these high-level areas at the end of its programme.

Meanwhile, to form the recesses a series of transfer beams at level seven have been installed to support the columns above, which do not match the grid of the lower floors.

Further down the building, the steel frame begins at basement level, which extends beyond the footprint of the structure to form a subterranean car park.

The ground floor is a double-height space, accommodating the main entrance foyer, two retail units and a separate ground floor office suite aimed at start-ups or other small businesses.

A double-height pedestrianised colonnade, aligned with a forthcoming public route will connect 4 Angel Square with the existing NOMA estate.

The building will be environmentally conditioned with heat pumps. The LED lighting, too, is extremely efficient while the roof has been used to house banks of photovoltaic panels. All systems are electric – no fossil fuels are involved.

The roof steelwork steps back from the main structure in order to accommodate a BMU, and to form this area a further series of transfer beams are installed at level 11.

Bowmer + Kirkland North West Regional Commercial Director, Paul Sykes, says: "4 Angel Square will be a landmark office development, setting new benchmarks for sustainability and creating new high-quality workspace that will support Manchester's recovery."

Summing up, Sir Richard Leese, Leader of Manchester City Council, says: "NOMA is playing a crucial role in revitalising a key part of Manchester city centre and will create jobs and drive investment into the city. Cities will need to move quickly to mitigate the economic impact of COVID-19 and major projects such as this help drive vital growth and signal a city that remains attractive for development."

4 Angel Square is scheduled for completion by early 2023. ■