

# BRITISH PRECAST NEWS

## ARCHITECTURAL & STRUCTURAL

Precast in a Post-Pandemic World

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# Precast keeps 'mega prison' project locked into schedule

Using 15,000 precast units



Image credit: FP McCann Ltd



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Work on the Wellingborough 'mega prison' project has continued to progress despite covid restrictions – helped by using more than 15,000 precast concrete units.

HMP Five Wells will be home to nearly 1,700 inmates on completion and this vast construction project has been widely acclaimed for embracing design for manufacture and assembly (DfMA), including the use of more than 15,000 precast panels.

The £253m project integrator contract for this 'mega prison', on the site of the former HMP Wellingborough in Northamptonshire, was awarded to Kier in May 2019 by the Ministry of Justice (MoJ) and is due to open in 2022. Thanks to the DfMA strategy and the widespread use of precast, construction has been able to continue despite the covid-19 working restrictions.

This is one of several schemes in the £2.5bn MoJ pipeline, which will deliver 10,000 new prison places, where the client is aiming to introduce greater standardisation to how its assets are designed, procured, delivered and operated – through a 'platform' or 'kit of parts' approach. At Five Wells, Kier has introduced repeatable, standardised components across the thirteen buildings on the site. Around 80% of the design has been standardised.

"As the main contractor, we have acted as 'integrators' to bring tangible value to the design, including enhancements to multiple components such as the composite sandwich panel construction (two layers of finished concrete with a thermal insulation core) with cast-in windows, shower enclosure details, and integration of the M&E modules," explains John Handscomb, procurement lead at Kier.

"The precast components for cell doors, walls and flooring have all been optimised to avoid follow-on work as far as possible. For each cell, M&E utility conduits and points have been cast-in, and shower trays are also cast into the floor units. All this reduces on-site trades and will improve serviceability and security.

"Our approach at Wellingborough has facilitated high levels of collaboration across our supply chain and we have brought together three separate precast suppliers. Each business is able to work to their strengths to deliver offsite excellence and a better product for our client."

FP McCann is one of the three precast concrete contractors working on the project.

"In the past, offsite construction has been viewed as more expensive than conventional brick and block; however, at the new Wellingborough prison development we have brought economies of scale to the programme," says Kieran Fields, marketing manager at FP McCann.

"FP McCann's early involvement in the planning and the design stages, including the early integration of all the supply chain partners, was crucial in determining accurate control over the manufacturing and procurement process.

"Kier is pushing the boundaries of BIM level 2 with innovative digital technologies that will enable standardisation and replication across future prisons. FP McCann is supplying ground beams, internal cross walls, corridor walls, cell slabs and sandwich panels, all of which dovetail neatly into such standardised packaged schemes.

"The components are accurately estimated and modelled within a digital BIM Level 2 environment, which includes their delivery to site and the part they play in the assembly operation. Using the latest digital modelling software, we are now taking ownership of the design and construction phases."

## Wellingborough 'mega prison' project

1,700 inmates to be housed in the new prison

£253m budgeted for the completion of the project

15,000 precast panels to be used across the prison

400 frame components installed per week

2022 opening schedule still on track

As well as addressing skills and labour shortages, which are likely to become more acute with Brexit, on-site labour numbers and associated costs are greatly reduced, with productivity levels increased by the fast and efficient build process – a crucial factor in keeping HMP Five Wells on track after covid-19 struck.

"It also has a positive impact on health and safety," adds Fields. "Our modular precast concrete systems are unloaded directly from the delivery vehicle and installed by a skilled and highly trained fixing team in one single operation. There is no need for scaffolding or storage of materials on site. Wet trade deliveries and drilling are also reduced to a minimum."

The project has used a just-in-time delivery strategy, with 24-hours' worth of precast storage on site. Seven crawler cranes have assembled the kit-of-parts prison, installing the precast frame at a rate of 400 components per week.

The precast concrete structures have now been completed to the seven prison house blocks, with construction work moving onto the internal fit out. Prisons minister Lucy Frazer announced in October that G4S would run HMP Five Wells and confirmed it was still on schedule to open in early 2022.

The MOJ is planning to construct another four new jails over the next six years, and the standardised component-based design used at Wellingborough will be applied on the other prison projects, leveraging economies of scale for the programme, and ensuring plenty more opportunities for the precast sector to showcase its innovative work.



Thorp operates at 100% throughout pandemic peak

No reported cases of Covid-19 to date



All images credited to: Thorp Precast Ltd

A large, well-organised factory and strict health and safety procedures helped Thorp Precast deliver projects on programme throughout the coronavirus lockdown, across the UK.

While many construction sites, particularly in urban locations, can be crowded and congested workplaces, the opposite is the case for precast manufacturing plants. The invariably spacious factories allow for safe, uncluttered working environments where enforcing the covid-19 social distancing protocols is much more feasible.

Thorp Precast operates from a large site covering over 20 acres in North Staffordshire, where plenty of space is a prerequisite due to the size of the moulds the company is working with.

"We have found that physical distancing was relatively easy to achieve in an already well-managed factory, with plenty of spacing between each active working mould over several casting sheds," explains Steve Morgan, technical sales manager.

When the pandemic struck, Thorp senior management gave a detailed briefing both collectively and individually to all operatives, outlining the dangers of covid-19 and the need to act responsibly within strict Government guidelines to continue working.

"Following close consultation, 100% of Thorp staff opted to continue working in line with the new measures, which to date has resulted in no lost productivity and far more importantly no recorded cases of Covid-19," explains Morgan.

"We were able to continue operations in a controlled environment with the close cooperation and full commitment of all staff."

There have been a few changes to operating procedures in the factories to ensure social distancing requirements are met.

"We have one person working per mould, reduced working hours, and fewer people working in concrete pouring teams," explains Morgan.

"From a welfare perspective, we also have bubbles for workers when travelling to and from work in the same vehicle. Canteens, drying rooms and small offices were closed. Instead, we created outdoor spaces and additional recreational areas. Breaks were split and staggered, workers clocked in at the factory gate and not on a machine, and strict one-way systems were introduced. We also restricted access to the site much more, with everything carefully recorded and booked in.

"But the most important thing was we exercised common sense in what was already a well-spaced working environment."

Away from the factory, Thorp workers also had to follow social distancing requirements on delivery to site and during installation of the precast units.

"They were small teams, but they all used relevant PPE, particularly if working face to face, and installed panels with operatives on either side of a precast panel, ensuring that social distancing was maintained at all times," says Morgan.

"A huge benefit of only needing four to five men on site at any one time to maintain maximum productivity is that we can install a conservative average of five to six panels per day on our projects, regardless of the wider restrictions of covid-19," he adds.

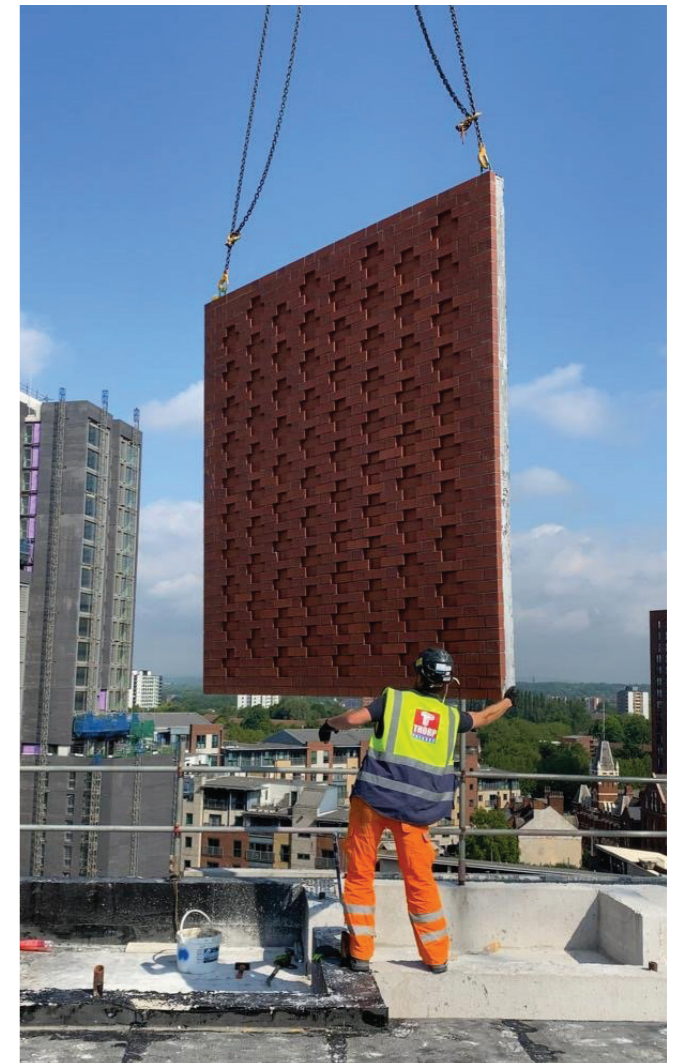
This meant programmes were maintained across Thorp's projects, including two of its most high-profile contracts.

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On the new HM Revenue & Customs office at 3 New Bailey in Salford, a 157,000 sq ft development, Thorp is working with main contractor Bowmer and Kirkland, engineer Cundall and architect Make, delivering brick-faced precast panels in a 'basket and twill weave' design.

On another office scheme, in the Wood Wharf development in London Docklands, Thorp is working with Canary Wharf Contractors, engineer Thornton Tomasetti and architect Allies and Morrison, where its contract is also for design, manufacture and installation of brick-faced precast cladding panels.

"Both projects continued to have panels installed on the structure throughout the peak of the pandemic lockdown period, ensuring the façade package was delivered on time and on budget," says Morgan.





Sterling keeps biggest contract on programme during lockdown

£5.8m worth of contracts continue



All images credited to: Sterling Services Ltd

City of London Academy in Hackney and a neighbouring leisure centre is being delivered successfully despite the challenges of covid-19 working restrictions.

In 2019, Sterling Services won the £4m contract to design, manufacture and install the architectural precast panels to City of London Academy in Hackney, as well as the £1.8m contract for the adjacent Britannia Leisure Centre. Then, a few months later, covid-19 struck.

"This was a record-breaking contract for Sterling, so naturally we were anxious when the pandemic hit; would we be able to continue manufacturing?" recalls Sterling managing director Chris Bell. "Would we suffer from staff shortages? Would sites remain open and would we be able to access materials?"

Keeping to programme was a crucial part of the contract for Hackney Academy, with the project due for completion in 2021. Feilden Clegg Bradley Studios is the architect and Morgan Sindall is main contractor for the scheme, where Sterling Services is designing, manufacturing and installing architectural precast cladding. The academy will feature Portland and brick-faced panels while the leisure centre will use Portland-finished panels.

"At the beginning of the pandemic, there were initial concerns regarding liquidated and ascertained damages and this played a big part in the board's decision on whether to close the business for lockdown or not," explains Bell.

However, Sterling was in an advantageous position compared to many companies.

"Due to our large open spaces and the nature of our processes it was feasible to continue production at the same rate whilst maintaining social distancing and 'covid-safe' health and safety measures," says Bell. "Operatives were able to stay two metres apart while operating concrete skips and gantry cranes, with plenty of room to stay apart while pouring, finishing and loading panels."

Rigorous hygiene measures were put in place to protect the workforce, including providing hand sanitising stations around the factory, posters to communicate the dangers and symptoms of coronavirus.

"One employee has been tasked with travelling the site throughout the day, sanitising all door handles, hand rails, and toilets, as well as fitting clear spacing markings to floors, desks and tables to guide employees regarding the two metre rule," says Bell. "Risk assessments and covid-specific inductions communicated this clearly to the workforce."

Sterling also had to make adjustments to its welfare provision so that social distancing could be maintained.

"Our welfare facility did not have capacity to house all our workforce at two metres apart," says Bell. "To rectify this, we transformed our board room into an extra canteen, and staggered the workers' breaks to ensure social distancing was adhered to."

"This meant that our production efficiency improved, as half the operatives were working at any break time, when previously that would have been down time."

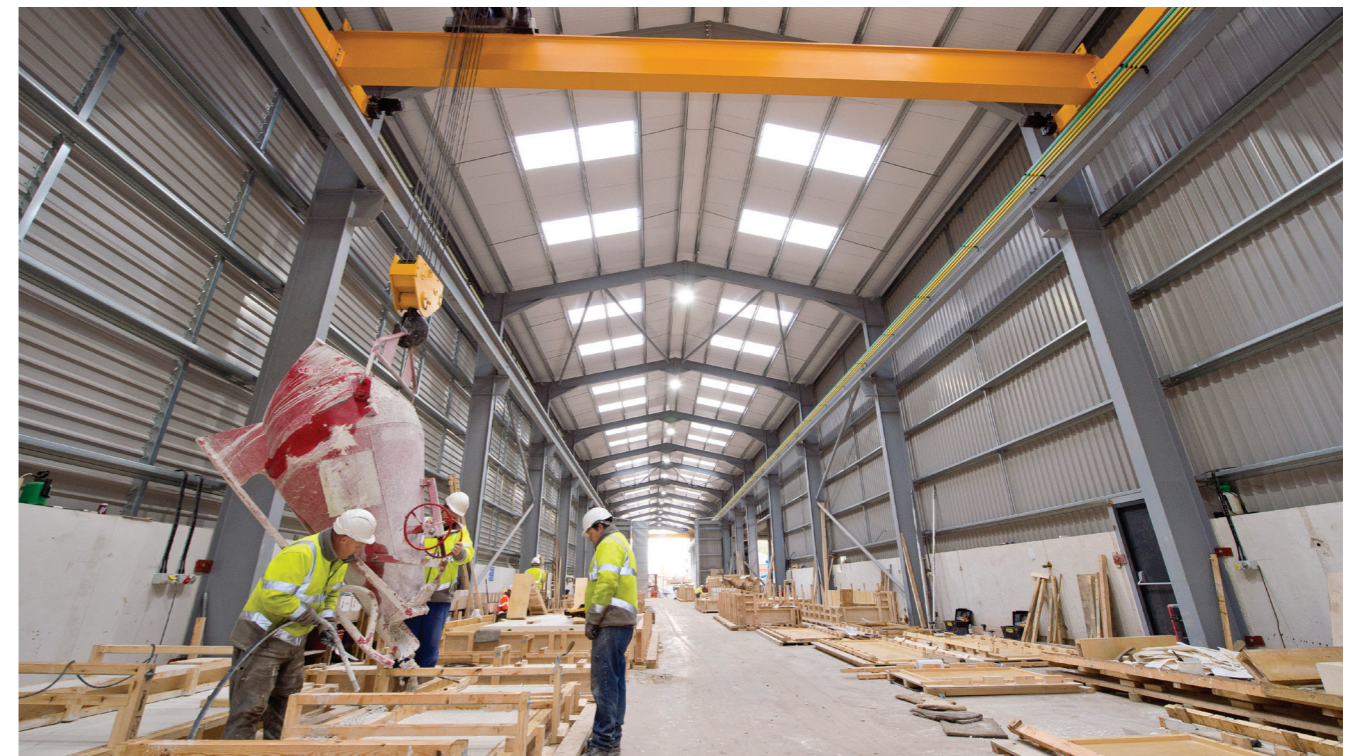
One crucial manufacturing issue for Sterling to consider was availability of materials.

"To ensure that we had the capacity to continue manufacturing, we purchased many materials in big bulk loads to insure against any future closures of supplier businesses," says Bell. "Doing this at the start of the lockdown period was a foresight we came to be glad of in the coming weeks when merchants, timber mills, and of course sanitary suppliers started to either close or run out of stock."

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Work on the City of London Academy to install the façade panels, comprising large double window storey height units with integral bricks, copings and cills, was able to commence on programme on 18 May. One of the key stones at the front of the building contains the City of London Emblem which was cast into the precast unit from a rubber mould. This unit was installed in early June. Sterling's work on the Hackney scheme will continue through into next year.

Bell adds: "We are incredibly grateful that Sterling has been able to operate effectively during these challenging times, keeping work on schedule and protecting the jobs of our workforce and the business as a whole."

"We look forward to the completion of Hackney as our biggest contract yet and hope for continued growth as we take on a full order book until June 2021."



# Five reasons why precast can thrive in a post-pandemic world

## 1 Social distancing is easy to enforce in precast factories

By their nature, precast manufacturing plants are large, spacious facilities, without the clutter and with fewer workers than on busy construction sites. In this organised environment, it has been straightforward for precast companies to introduce social distancing and other covid-19 working protocols. Operatives are mostly able to stay two metres apart, and for tasks where this is not feasible, wear the appropriate PPE. Tough hygiene measures can be put in place across the factories, including in welfare facilities, plus signage communicating the need to observe the correct operating procedures. Bubbles can be introduced, and working shifts and breaks staggered to keep different groups of workers separate if necessary.

## 2 ...and social distancing is straightforward during precast installation on site

Just as precast factories operate with small, efficient teams of workers, the same applies when the units are transported to site for erection. Typically, teams of around four to six operatives take charge of installation of precast sections on projects, and they can travel to sites and work in a 'bubble'. On site, the work itself requires minimal interfacing with other workers on the project, and even the panel installation means minimal close working with other operatives. In exceptional circumstances where close working is required, extra PPE is supplied.

## 3 Digital adoption has been rapid in the precast sector

Precast factories naturally lend themselves to digital processes, and 3D design software is commonly used to model structural and architectural precast elements, right down to detailing for the fixings and lifting eye positions. Already one of the most digitally advanced areas of the construction supply chain, precast companies are now starting to work to 4D BIM (programming), 5D BIM (cost modelling) and 6D BIM (where product data is handed over to the asset owner for operations and maintenance purposes). Meanwhile, robotics and automation are coming into precast factories for mould manufacture. Little wonder that precast professionals had little difficulty adjusting to the remote working demands of the pandemic lockdown.

## 4 The government is backing offsite construction to help the recovery

'Build, build, build' is the Government's post-pandemic mantra, and offsite construction is going to be central to that. The Department of Health, for example, has promised offsite construction will be used for its £3.7bn building programme for 40 hospitals over the next decade. Offsite is also seen as a way of solving the shortfall in housing delivery – last year, the industry fell 50,000 units short of the Government target of 300,000 new homes. Precast companies have decades of experience – unlike many new entrants to the offsite market – and their expertise and innovation puts them in a strong position to capitalise. In an increasingly urbanised world, where high-rise living is more common, precast construction systems should come into their own.

## 5 Precast can cut waste and help the environment

Sustainability has shot back up the agenda in recent years, not only due to Greta Thunberg, but amid mounting concern about construction's impact on the environment; the built environment accounts for 40% of carbon emissions according to the UK Green Building Council. With its factory process and efficient on-site logistics, precast concrete can deliver huge waste reductions during construction operation as well as better quality. Once in operation, precast also offer far better thermal properties, compared to other materials, offering further carbon reductions across a building's life-cycle.

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