

Woodside High School, London

In north London, construction of a new school learning campus is nearing completion. The project has made use of insulated concrete formwork for its external envelope. **James Luckey** reports.

Woodside High School is a Business & Enterprise Specialist School, based in Wood Green, London. As a secondary comprehensive it teaches around 900 pupils aged 11–16.

In recent years the school has been undergoing a £24.9 million refurbishment, including new build, as part of the since-defunct Building Schools for the Future (BSF) programme.

Education Secretary Michael Gove opened a new teaching block at the school in December last year. The new building is part of the project, which will amalgamate two special schools with the mainstream school. It comprises the new build of three teaching blocks, with the refurbishment of the three existing buildings and external landscaping of the campus.

The final phase of work on the three-year scheme, due for completion in the autumn, is the construction of an art, music and drama block, alongside a special school. Driving the entire project is Apollo Education, appointed as main contractor by the London Borough of Haringey.

Modern methods

For this final phase, Apollo and its structural engineer Clark Smith Partnership (CSP) opted to use a modern method of construction for the external envelope of the building, which has a reinforced concrete frame.

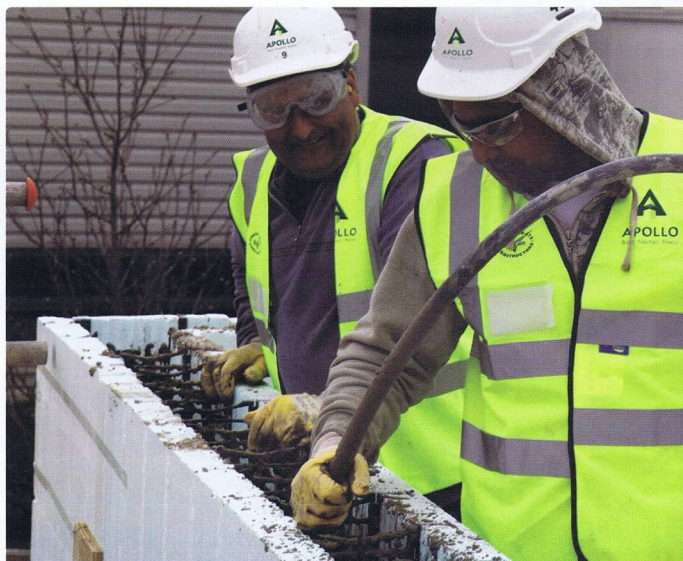
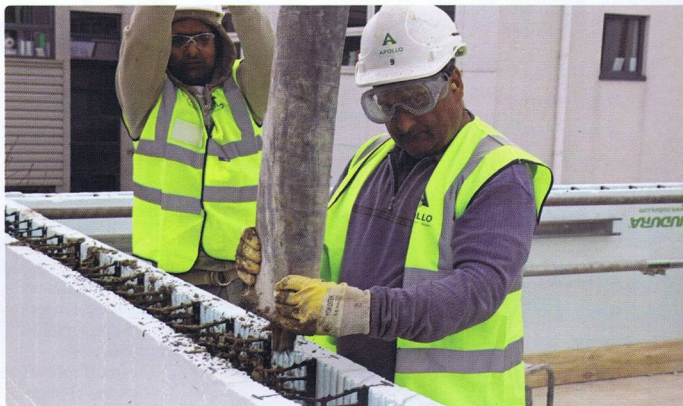
CSP prescribed the external structural design as needing: good vertical load-bearing capacity; good lateral wind resistance; an ability to accommodate large openings; good thermal insulation; durability; and ease/speed of construction.

Precast panels had been considered but were rejected in part due to the necessity for extra drawings and design flexibility.

Instead Apollo and CSP chose to specify insulated concrete formwork (ICF) technology. Terry Smith, director of CSP, says the use of ICF meets all the structural requirements and overcomes the inverse relationship between structural strength and thermal insulation.

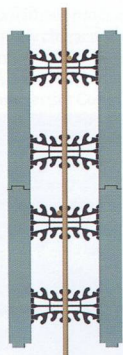
For the first time in the UK, the ICF system is being provided by Canadian firm Nudura. The company has a notable track record in North America, including provision of ICF to build the first zero-carbon school in the USA. Jean Marc Bouvier, international sales and field support for Nudura, says that in America, where it has been established, the cost of the system is already the same as for traditional building methods.

Terry Smith of CSP says the structural resistance of a 150mm-thick wall using C30/37 concrete (as used at



Above right: Pouring the concrete into the ICF core during construction at Woodside High School.

Right: Use of poker vibrator to aid compaction.



Above: Cutaway drawing of the Nudura ICF system, shown from above.

Woodside High School) will be sufficient in most cases, where the clear height between floors is 3.3m or less.

Smith adds that the arrangement results in fast, robust and durable construction. The inherent lateral load resistance of the wall allows the elimination of 'wind posts' commonly used with other types of envelopes.

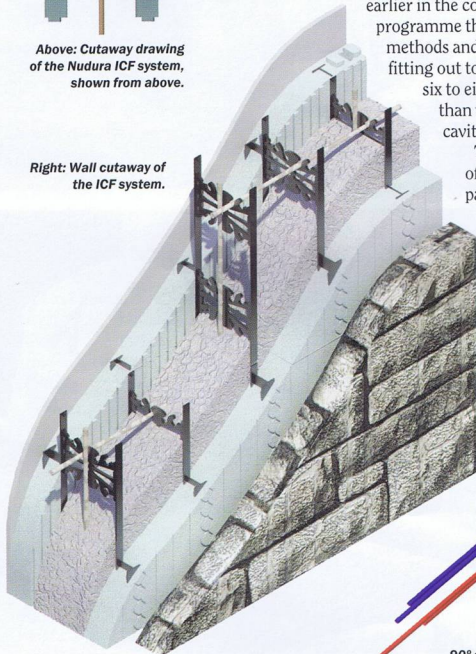
Sustainability

The inclusive learning campus is being constructed with sustainability in mind and the ICF system contributes, achieving greater overall energy efficiency through good thermal insulation and air permeability. In addition, Apollo says the forms have enabled each building

envelope to be made watertight earlier in the construction programme than traditional methods and have permitted fitting out to commence some six to eight weeks sooner than with conventional cavity block work.

The forms consist of two stay-in-place panels of expanded polystyrene connected with a hinged folding web. To speed up installation and cut down on

Right: Wall cutaway of the ICF system.



Furthermore, the system enables forming of walls in 100, 150, 200, 250 and 300mm core widths complete with preformed 90° and 45° products, tapered top forms, brick corbel forms and extensions in every available core thickness.



waste, the standard form covers 1.12m².

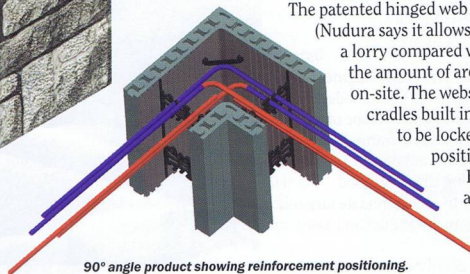
Forms are stacked, reinforced and then filled with concrete, creating a solid reinforced monolithic wall for above- and below-grade applications. More than 50% of the product by weight is comprised of recycled material and Nudura says it contributes a proven 50% reduction of construction waste in comparison to conventional cavity block construction.

The system can be shaped, contoured and formed to any desired vertical wall profile, including radii as tight as 600mm. Furthermore, the system enables forming of walls in 100, 150, 200, 250 and 300mm core widths complete with preformed 90° and 45° products, tapered top forms, brick corbel forms and extensions in every available core thickness.

Reinforcement

The patented hinged web allows units to be shipped flat (Nudura says it allows for 40% more products on a lorry compared with other ICFs) and reduces the amount of area needed to store the forms on-site. The webs also have pre-positioned cradles built in, allowing reinforcement bars to be locked into place in a variety of positions for various building types.

Horizontal reinforcement bars are normally placed at 450mm spacing and positioned alternately on either side of the centreline of the wall. Vertical bars are located



90° angle product showing reinforcement positioning.

centrally in the wall.

At Woodside High School, flexibility of the ICF envelope has allowed Apollo to replicate the exterior architectural features of Woodside's other, existing, buildings. For internal works, the formwork is covered with standard gypsum wall board and the EPS makes cable chasing and general fitting out simpler.

Achieving goals

The project is scheduled to finish around the beginning of the new school term in the autumn but the use of ICF has already attracted Apollo Education. Its project manager John Hill says, "We are experienced in working in live school environments and the system has given us additional assistance in successfully meeting a challenging schedule and sustainability goals."

All parties are hopeful that this first trial of the ICF system will be a springboard for the future. Earlier this year, Nudura launched three new thermal inserts that improve the thermal performance of the building envelope to meet and exceed Building Regulations and Passivhaus Standards. ●



The EPS block can be simply cut to ease installation.