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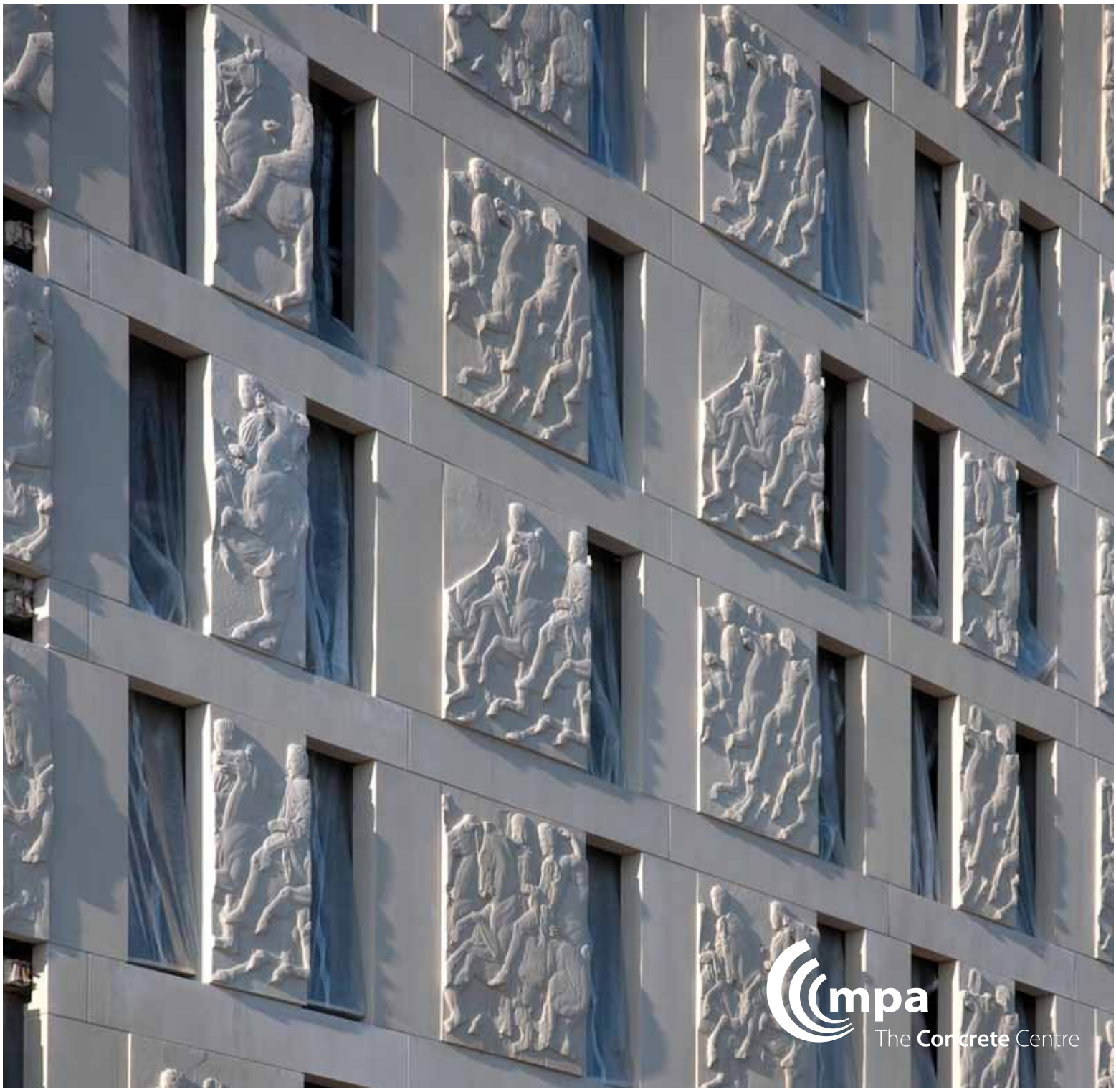
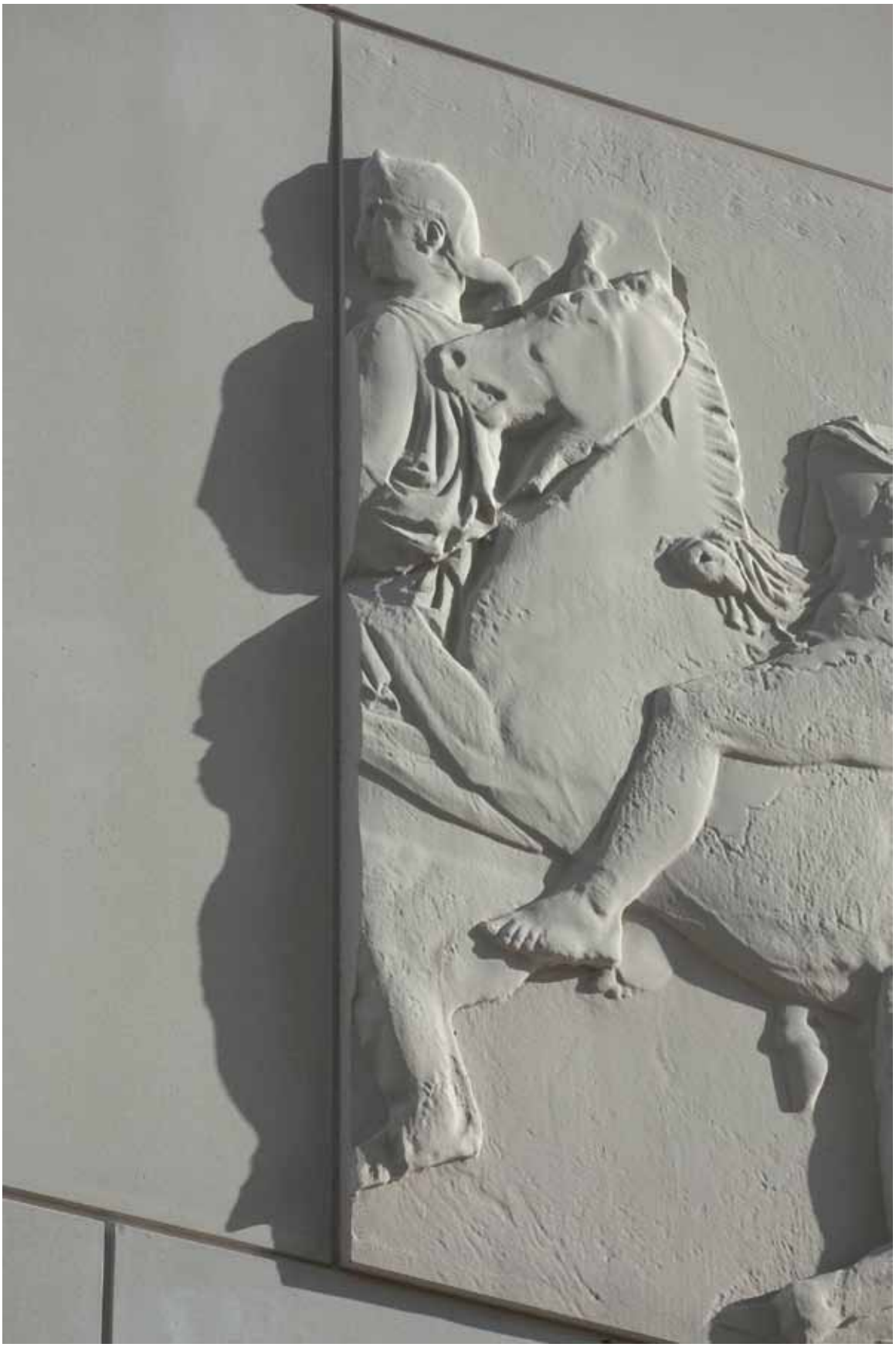
BIG FRIEZE
What are the Elgin Marbles doing on a housing block in London's Olympic village?

STAR WITNESS
A new courthouse in Portugal makes a compelling case for the simple elegance of concrete

NOW IN COLOUR ...
David Chipperfield builds a fortress in pigmented concrete on Wakefield's waterfront





CLASSICAL GOOD LOOKS

Niall McLaughlin Architects has taken the Olympics back to their roots by cladding one of the housing blocks in the 2012 athletes' village in friezes cast from the Elgin Marbles. Graham Bizley finds out how – and why ...

Carved by Greeks, blown up by Venetians, transported to England by Lord Elgin and the subject of heated debate ever since, the sculptures of the Parthenon have had a traumatic history. But for a residential block at the London 2012 Olympics athletes' village, they have been part of a creative rather than a destructive process. Sections of the frieze have been digitally scanned, made into moulds and cast in concrete to clad the building in a bold attire of light, shadows and movement.

The athletes' village is a residential development on the east side of the Olympic park that will provide 17,230 beds for competitors and officials during the Games, before conversion into 2,818 flats, half of which will be affordable. Most of these will be in 10-storey courtyard blocks, the first now nearing completion. The scale is unusual – more like something you might find in continental Europe than in London, where tall housing development has generally been limited to widely spaced slab blocks or towers.

So far, 16 architectural practices have been appointed to work on the village, ensuring variety across the 60 buildings. As part of the Olympic Delivery Authority's commitment to include emerging talent, a number of up-and-coming practices have designed facades for buildings planned by more established names. To some, the idea of designing only the facade of a building overseen by others would be abhorrent. Niall McLaughlin however has seized the opportunity to experiment with precast concrete. "With a cast material you can very accurately lift detail off other things, like in brass rubbing," he says.

Working on a base building by Glen Howells Architects, McLaughlin has indulged his interest in Gotfried Semper's theory of dressing (bekleidung), according to which the origins of architecture are thought to lie in the cloaking of a frame with woven hangings as protection against the elements.

The theme of the Parthenon frieze is a procession towards the Acropolis that took place every four years in ancient times as part of the Great Panathenaic Festival. This also included sporting games, so the analogy with the modern Olympics is apt. But McLaughlin plays down this obvious reading and points instead to the iconic status of the Elgin Marbles and the different processes involved in their production. "The Parthenon stones were made in a particular place at a particular time. Their deracination and constant re-idealisation has made them into something else – something iconic that people recognise, like a picture of Elvis."

On the building the elevations have been composed so that the relief panels appear to be the infill between smooth-cast column and beam elements of a trabeated structure. "We wanted to design facades that would express in a very direct way the frame behind," McLaughlin says. Despite this apparent clarity, the panels are actually made in various different larger forms with false joints in places. McLaughlin revels in the variety of the

Photos: Niall McLaughlin Architects

ABOVE
The reliefs are always projected in front of the adjacent smooth panels

LEFT
Negative glass-fibre-backed rubber moulds were made of five sections of the frieze

BELOW LEFT
The panels were cast in a variety of large forms, with false joints in places

PROJECT TEAM
Client Olympic Delivery Authority
Facade architect Niall McLaughlin Architects
Lead architect Glenn Howells Architects
Contractor Bovis Lend Lease
Precast concrete subcontractor Techrete
Historical consultant Dr Ian Jenkins, senior curator – Ancient Greece, British Museum
3D scanning Chris Cornish (sample and hold), Tom Lomax
Positive relief machining Metropolitan Works

precast elements, likening it to the juxtaposition of order and difference in Sol LeWitt's 122 Variations of Incomplete Open Cubes.

Five different sections of the frieze depicting horses were chosen for the relief panels with the help of British Museum senior curator Ian Jenkins. These sections were scanned digitally while the museum was closed one night by Tom Lomax of the Slade School of Fine Art and Chris Cornish of 3D filming company Inition.

Positive "plugs" were then cut out of a polyurethane model board using a 5-axis router at London Metropolitan University. Using a 5-axis rather than a 3-axis machine allowed the board to be undercut, as a sculptor could do working by hand, which meant the strong shadows of the original are more accurately reproduced. After the initial scanning, the process was managed by specialist precast contractor Techrete.

Negative glass-fibre-backed rubber moulds were made, two from each plug, to allow the concrete casts to be created more quickly. Five different-sized panels were cast from each mould by fixing a temporary stop-end, making a total of 25 panel types. To achieve a white finish, the concrete incorporates white cement with a white Malaga Dolomite aggregate and buff sand from Gloucestershire. The choice of colour is ironic considering the various attempts in the 19th and 20th centuries to "restore" the Elgin Marbles to their assumed original white – the stones would in fact always have had a honey-coloured patina.

The panels are fixed using stainless-steel brackets with tolerance for adjustment in three directions (see drawing). According to Techrete production manager Henry Clifford, the process on site was very carefully planned: "The panels were delivered in a sequence so they could be lifted straight off the trailer on to the building in a single operation."

A random number generator was used to order the panels on the elevation and there is just enough variety that the repetition is not apparent. The reliefs are always projected in front of the adjacent smooth panels, expressing the primacy of the construction system over the decoration, but they are cut abruptly at the panel edges so the horses seem to jostle in a continuous procession across the facades. By embracing the restrictions of the brief, and the possibilities of precast concrete, McLaughlin has produced a work of dignity and joy.
Graham Bizley is a director of Prewett Bizley Architects

Fixing the frieze

A prosaic housing block at the athletes' village in east London has been brought to life by a sculptural facade of precast concrete panels decorated with reliefs based on the Elgin Marbles. The 10-storey building will contain 113 flats in a new residential community on the edge of the Olympic park.

The structure is an in-situ reinforced concrete frame consisting of 500 x 250mm columns around the perimeter with two central cores. The 225mm flat floor slabs are post-tensioned to eliminate the need for down-stand beams, thereby maximising the floor-to-ceiling heights.

The precast concrete panels span the full storey height and are fixed top and bottom into the floor slabs via stainless steel brackets. Where space permits, a concrete corbel was cast into the back of the panel to transfer the load down to the floor. In tighter spaces where fixings were required next to columns, for example, a narrower stainless-steel bracket was cast into the rear of the panel. A 75mm-diameter hole in the floor slab allows tolerance to locate each bracket with a stainless-steel dowel which was then glued in place.

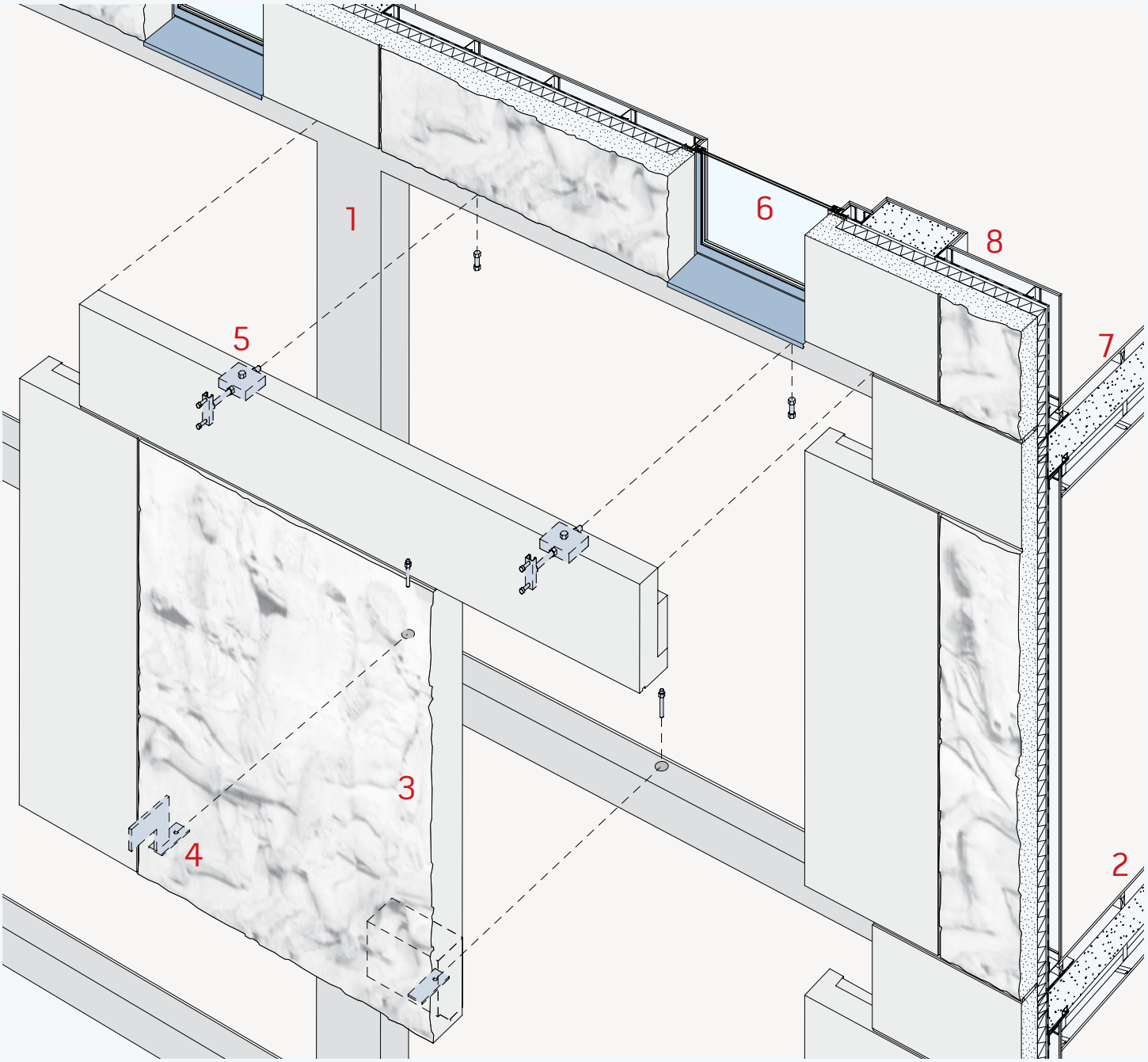
At the head the panels are restrained using precast concrete subcontractor Techrete's own adjustable fixing. Metal channels cast into the panel and the soffit of the slab allow adjustment in three dimensions; 20mm recessed joints between panels allow for up to 8mm of incremental movement. Adjacent panels are pinned together with stainless-steel dowels.

Insulation was pre-bonded to the precast panels prior to installation. Internally a metal studwork frame supports a plasterboard lining that wraps around the columns.

1. Structural frame
500 x 250mm in-situ reinforced concrete columns at nominal 4m centres.

2. Typical floor
15mm tongue-and-grooved particle board floor.
75mm void with acoustic battens at 600mm centres.
225mm post-tensioned in-situ reinforced concrete floor slab.
165mm ceiling service void.
Taped and jointed 12.5mm plasterboard ceiling on proprietary suspended hanger system.

3. Cladding panels
Precast concrete panels with cast relief on some faces.
20mm shadow gaps between panels, allowing for a maximum of 8mm incremental movement.



DETAIL: CUTAWAY SECTION THROUGH TYPICAL BAY

Joints sealed from both sides with rebated mastic bead.
20 x 10mm false joint recesses within panels.
Stainless-steel dowels between adjacent panels.
EPDM (ethylene propylene diene monomer) membrane bonded to rear of panels behind joints.
90mm rigid insulation fixed to rear of panels.

4. Lower fixings
Concrete corbel cast into rear of cladding panel carrying dead load where there is sufficient space.
Stainless-steel fixing bracket to locate corbel bearing on floor slab.
Stainless-steel brackets bolted to channel cast into rear of cladding panel where space is insufficient for the concrete corbel.
Brackets fixed with stainless-steel dowels resin-glued into 75mm-diameter, 100mm-deep holes in slab.

5. Upper fixings
Stainless-steel fixing brackets to restrain cladding panels to floor slab.
Brackets bolted to galvanised steel channels cast into underside of floor slabs and to rear of cladding panels, allowing for vertical and horizontal adjustment.

6. Window
Inward opening PPC (polyester powder coated) aluminium window frame mounted on galvanised steel bracket fixed to floor slab.
Window restrained to reveals of precast concrete panel with M8 bolts in six locations.
Double-glazed sealed unit.
PPC pressed aluminium cill fixed with clips to top edge of cladding panel.
Painted MDF blind box above window.

7. Floor edge
Continuous 90-minute proprietary mineral-fibre fire stop and acoustic barrier between slab edge and rear of cladding panels.
Insulation board to be installed locally after sealing of cladding panel joints.

8. Internal lining
100mm-wide proprietary light-gauge galvanised-steel studwork frame fixed to floor slabs at top and bottom.
Two layers of 12.5mm plasterboard taped and jointed with paint finish.
Air-tightness and vapour control membrane wrapped over outside of metal studwork frame and taped to columns and floor slabs.

Detail drawing by Graham Bizley