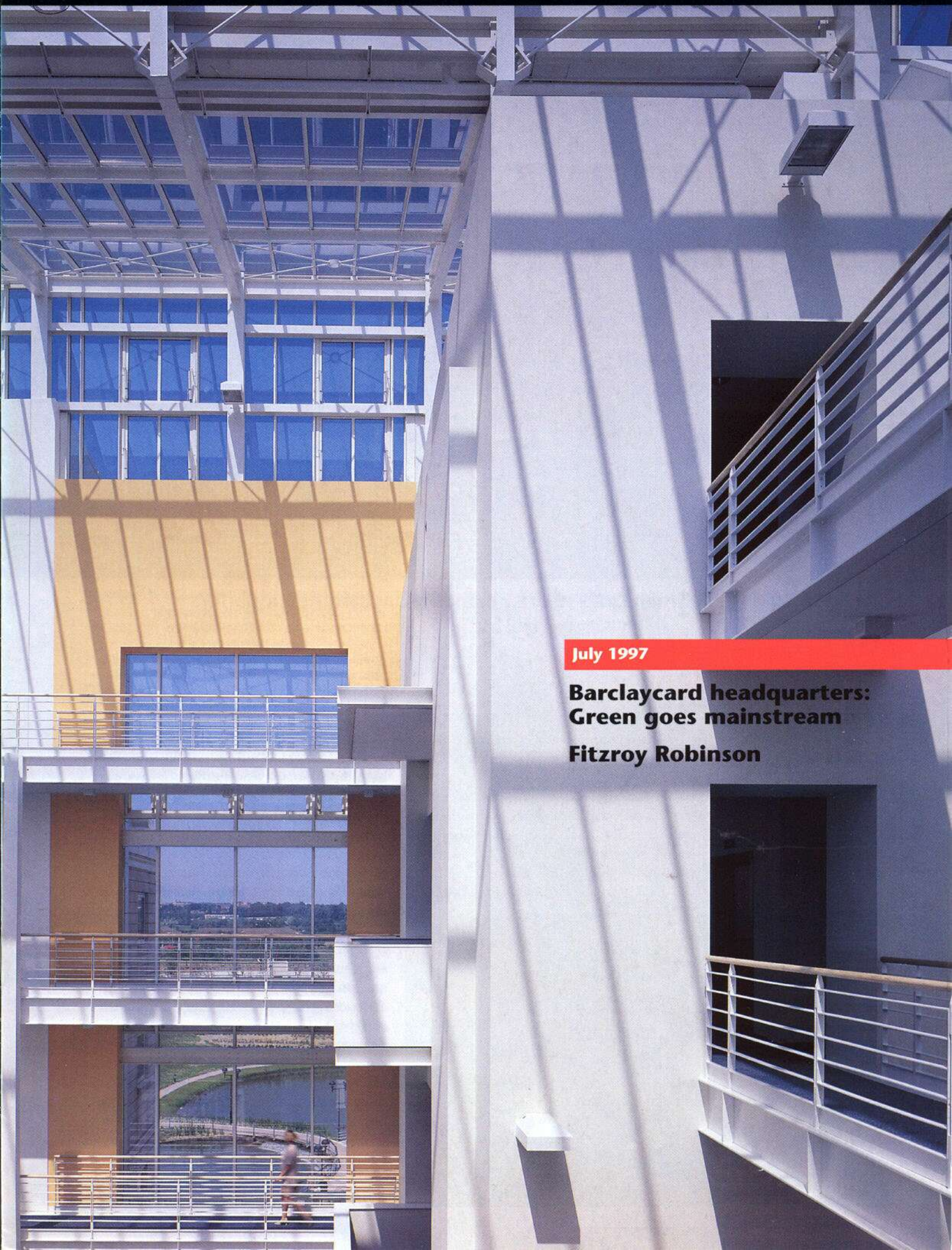
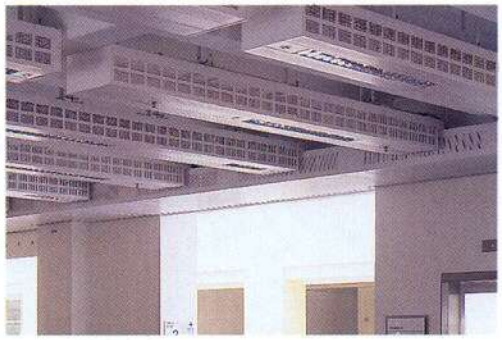
ARCHITECTURE TODAY • 80



July 1997

Barclaycard headquarters: Green goes mainstream

Fitzroy Robinson



BUILDING ■ Green goes mainstream: Barclaycard headquarters

Brian Edwards on a major low-energy hq by Fitzroy Robinson. Plus energy appraisal by Bill Bordass (p25). Photos: Peter Cook.

The new Barclaycard headquarters at Northampton confirms the emergence of a distinctive morphology for 'green' office buildings. The formal elements consist of long shallow blocks orientated east-west, shallow floor plates, atria or glazed streets which serve as environmental and social spaces, and mixed mode ventilation supported by air-conditioning in 'hot spots'. The pedigree extends back to the Gateway 2 building at Basingstoke by Arup Associates and embraces among others the PowerGen headquarters at Coventry by Bennetts Associates and the Scottish Office at Leith by RMJM.

The Barclaycard building's contribution is more architectural than technological. Fitzroy Robinson have focused on the aesthetic and spatial opportunities afforded by green offices, concentrating upon traditional architectural elements such as the facade, processional routes and public spaces. Rather than going for an overtly high-tech language they have sought a heavier, almost Kahn-like, distribution of served and servant spaces, expressed in weightier constructional elements. Hence to enter the building the visitor passes through a layered facade and into light-filled hierarchical spaces. Solid and transparent materials communicate an effective dialogue between the physics and aesthetics of the building.

Much of this dialogue results from the

Above *North facade. Water from the lake provides top-up cooling as required via chilled beams.*
Right *The 260m long building is naturally ventilated through the full-length internal street.*
Opposite *South facade sunshading; chilled beams; entrance rotunda; model showing north facade and roof glazing to internal street (ph: Chris Edgcombe).*

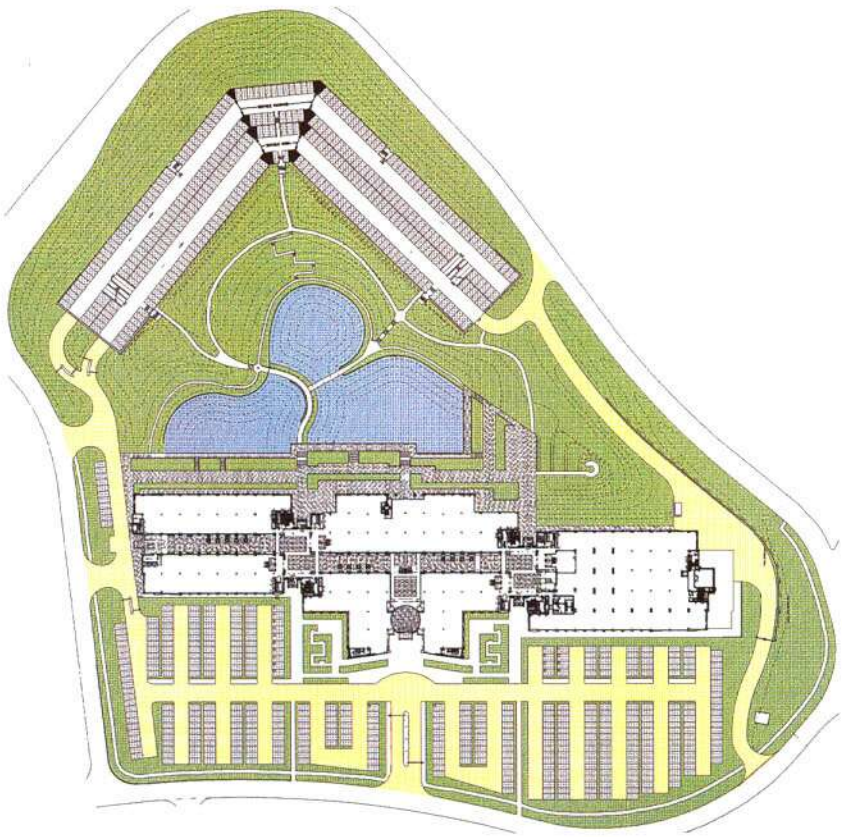
orientation of the building. The decision to have a long south-facing facade 260 metres long, with a corresponding facade to the north, had profound implications for solar shading and daylight penetration. The south elevation (which is also the main entrance facade) consists of solid veneers of enclosure and solar protection. Space and light is taken through and between the facade elements in a controlled manner. The solidity of the south elevation is highlighted by the deeply set windows and the separate structural articulation of walls. Added to this, sunlight dances off the brise soleil, creating dark shadows across the pre-cast concrete walls in a fashion rarely achieved with lightweight construction.

There is now a well developed language for the lightweight energy-efficient facade. The offices of Foster, Arups and Foggo have refined the glazed perimeter wall to the point where development has practically ceased. The challenge today is to perfect the responsive solid facade,

where solar protection has to be combined with high levels of daylight penetration. The solution adopted at Barclaycard by Fitzroy Robinson was to look closely at the balance between window and wall area and to address the technical performance of windows, varying their design according to the needs of daylight, ventilation and solar screening. The result is a series of complex facades, responding as much to the requirements of building physics as to conventional notions of architectural composition.

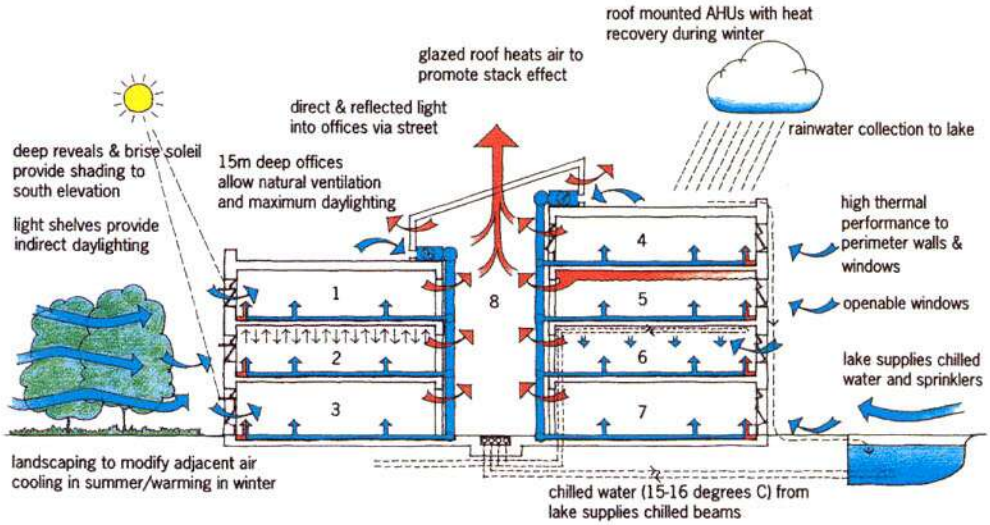
Modernist orthodoxy destroyed the

Above *North front.*
Below *Site plan and model. The landscape design, by Whitelaw Turkington, juxtaposes the formality of the southern approach incorporating extensive surface parking with the parkland character of the north side, which is dominated by the lake and planted slopes screening the multi-storey carpark at the apex of the site. The lake, which is both balancing lake and heat exchange, is effectively divided in three by the causeway and bridge which link across to the decked carpark. Both the weir, which flows out from under the causeway, and the fountain help to cool the water. The paved terraces step down to the lake in order to move people out away from the shade of the building. At the east end of the site, adjacent to the building, a grassed ziggurat forms a metaphorical source for the lake and, in the absence of a water cascade, allows lavender and santolina to tumble down the stepped slopes towards the lake. A wooden deck with lean rail borders the lake.*

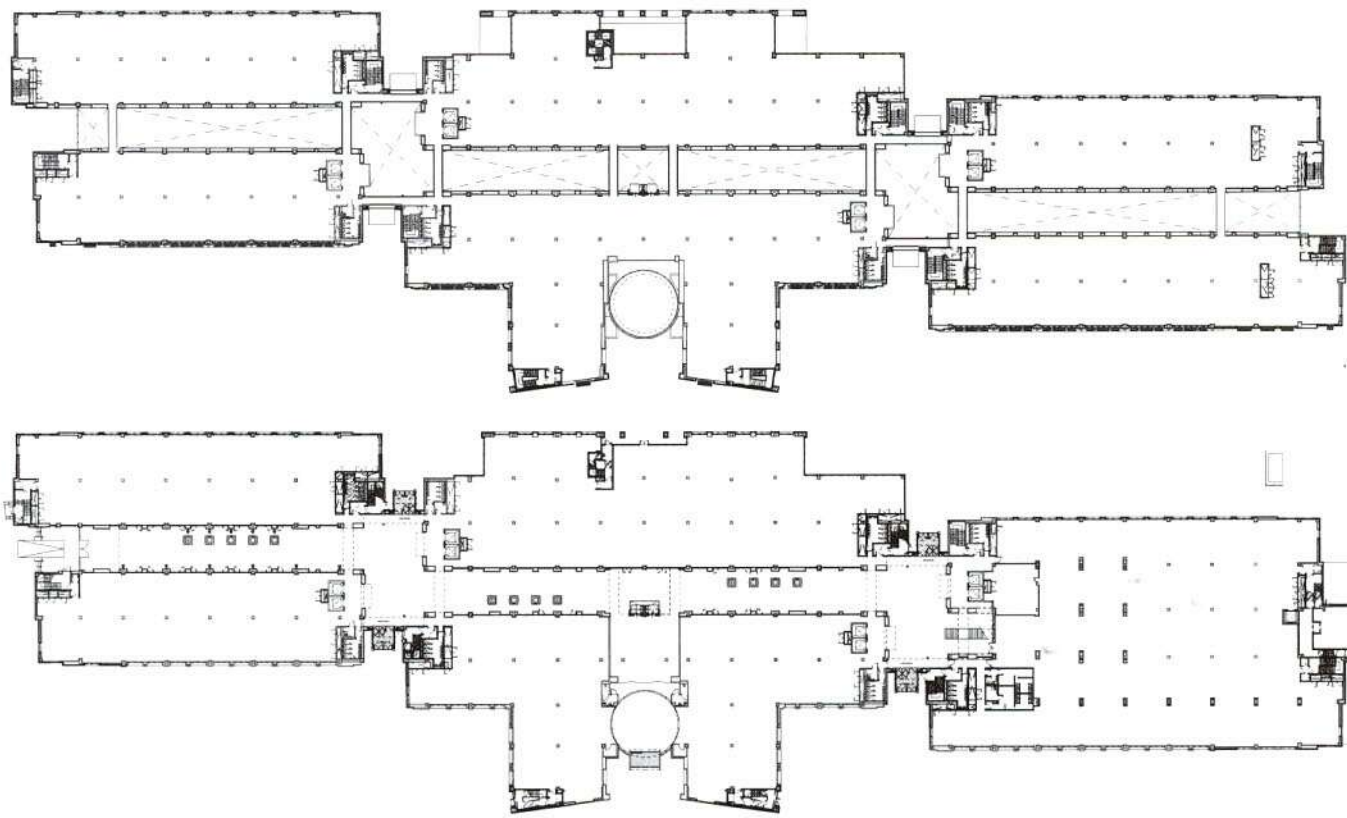


street as a civilising urban event: buildings became ends in themselves, sculptural objects in free space. Recently, as buildings have become ever larger, the street has reappeared but now as an internal element. Big buildings reach the point where they are not problems of architecture alone but of urban design; as Rem Koolhaas has pointed out, really large buildings are primarily exercises in city-making. Here at Barclaycard, with its working population of 2,600, the building is based on an urban typology of streets,

Barclaycard is by far the largest example of a mixed mode building pre-let to a private sector company, **writes William Bordass**. *To limit heat gains, the principal facades face north and south, with few windows east and west. This well-tried solution means solar control is required only on the south side, where modest window areas, setbacks, overhangs and projecting louvres suffice. External finishes are light in colour to limit solar heat absorption. The aluminium-framed windows, with clear double glazing, include fanlights with worm gear control, large manually*



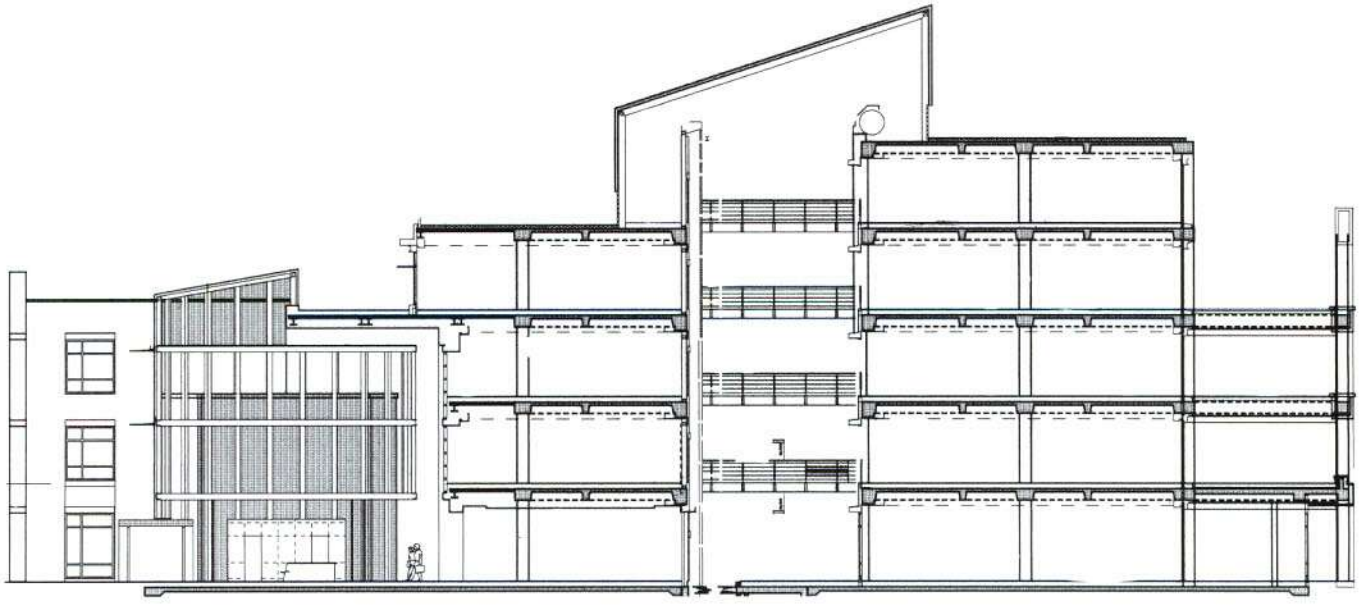
operated canopy-action elements in the middle and fixed glazed spandrel panels at the bottom (unfortunately often blocked by radiators introduced as a late saving). A row of tubes through the lintels – some 5000mm² per metre of facade – provides trickle ventilation but might cause draughts in winter. Glare is limited by internal blinds (here translucent white rollers) under occupant control, although in direct sunlight both the blinds and the internal walls of the street might cause problems when reflected in computer screens. The soffits of the double T-beam floors are left exposed to absorb heat and provide additional volume and height. This structure continues right to the top floor, which has a flat inverted roof above, helping to avoid the overheating problems that often occur when roofs are lightweight. In section, the building adopts the sides-to-centre ventilation approach now common in 'green' offices. Two galleries of 15m deep offices face onto a 9m wide street (with underfloor heating), which is designed to collect warm air and smoke in high-level fully-glazed reservoirs with outlets in the form of motorised windows. Offices are treated as a single fire compartment, with sprinklers fitted into the chilled beam assembly. The initial intention was that the glazed monopitch should face north, but calculations suggested that a south orientation would collect more heat, increase natural buoyancy and help to pull more air across the offices – whether this is a real benefit remains to be seen. Most of the offices are open to the street other than at the top level, where windows stop warm air entering from the street under adverse wind conditions. Awning blinds are fitted to the upper-level openings on the south-facing internal elevation. Design heat loads for office equipment were set at 15W/m², with provision for future increases by adding chilled beams. Barclaycard normally occupies only air-conditioned premises and required that the new building should have a maximum internal temperature of 25°C, as against the 27°C which naturally ventilated offices are more readily able to achieve. This meant including some mechanical cooling. If the street heats up, motorised windows open in steps, according to wind direction and weather conditions. If sensors on the floors detect high temperature or poor air quality, mechanical ventilation comes into effect for the relevant zone, supplied from variable volume plants which deliver filtered outside air (warmed if necessary) to all floors at up to 3 air changes per hour. The air is carried by concealed ducts within the walls, passes through the floor voids, emerges from floor terminals and leaves naturally via the street. If further cooling is required, the chilled beams come into operation, cooled via a heat exchanger by water from the lake. Ammonia chillers (avoiding harmful refrigerants) are also included but should be needed only if inside temperatures exceed 25°C. Lighting to the offices is by daylight topped up by intelligent luminaires; the impression in daytime is somewhat subdued – uplighting and wall-washing might have helped. Overall the building cost about the same as an air-conditioned equivalent, so it needs to deliver either added value or reduced cost in use. Significant electricity savings are likely, given the passive measures, efficient lighting and ventilation and limited use of mechanical refrigeration. Gas consumption is likely to be more normal: insulation levels are not spectacular, air tightness is uncertain (even before the trickle ventilators are taken into account) and effective energy management will need care. Environmentally, however, such savings can be obliterated by increased car use to out-of-town sites, so it was encouraging at 5pm to see half-a-dozen buses waiting outside the building!



blocks and squares – the internal mall taking the place of the urban street, the atrium of the square etc. The advantages are obvious in terms of orientation, social interaction and the kind of functional-cum-territorial definition which big companies seem to need. The precedent, of course, is Niels Torp's SAS Building in Stockholm which, with its white lofty sunlit volumes, helped give the internal street iconographic status.

Top *Main entrance. To achieve the tight construction period of 20 months, extensive use was made of prefabricated elements, including precast concrete cladding.*
Plans *Second and ground floor. The office accommodation is provided in six 15m deep floorplates on either side of the 260m long internal street. The internal street steps up by half a level in the easternmost block to accommodate the card bureau area below.*

Underpinning the spatial and formal interactions lies a correspondence with energy management. The mixed mode system depends upon differences in air pressure which varying degrees of transparency, in both plan and section, create. The office accommodation is provided on a 15 metre floorplate, enabling air to find its own way around. This discipline helps generate the form of the building at both a fundamental and detailed level, in the

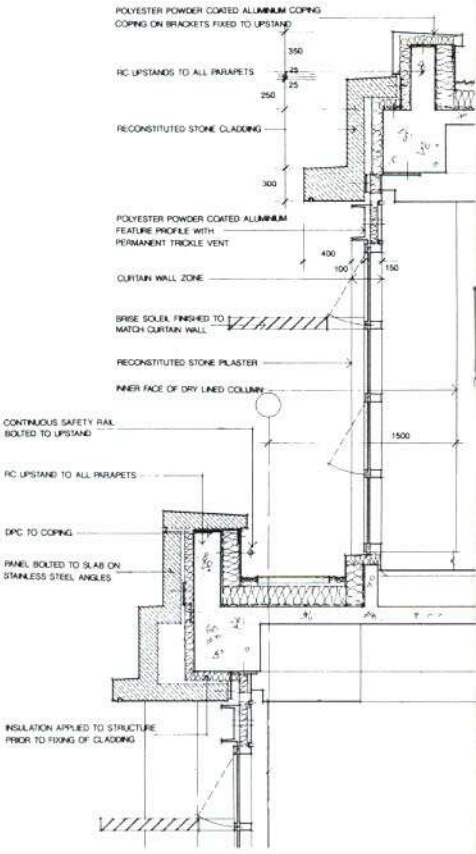


spatial distribution of the office blocks, the design of the chilled beam ceilings and the pattern and size of windows.

The offices ventilate to the outside and to the internal street. They are conceived as solid volumes of accommodation surrounded by space and light. Tall, deeply set windows with an urban verticality flank each block. Periodically the long streets are crossed by lightweight bridges which almost float beneath the glazed roof. In the internal street, the unfolding of volumes and spaces bathed in soft sunlight is as good as any urban experience.

The validity of the streets and squares is both social and environmental – that they are occupied by cafes and sandwich bars at ground level is as relevant as their role as ventilated spaces. The division of the vertical spaces by horizontal bands of accommodation creates a rhythm which sunlight brings alive. Coloured yellow,

Above *The staggered plan allows the internal street to be punctuated at two points by squares.*
Section *The £42m project, which achieved a BREEAM 'excellent' rating, was designed within prevailing rental levels in the locality. This fixed the construction budget at £110/ft², including tenant's fit-out, multi-storey car park, lake and landscaping – equivalent to £76/ft² for the building.*



Project team
Architect: Fitzroy Robinson; project team: Robin Booth (senior director), John Vincent (project director), Michael Winter, David Weston-Thomas, Robert Thompson (site architect), Ronnie Maclellan, Blaise Coonan, Pam Walton; landscape: Whitelaw Turkington; qs: Hart Gilmore Assocs; civil/structural engineer: WSP Consulting Engineers; services: Troup Bywaters & Anders; acoustics: Hann Tucker Assocs; contractor: Tilbury Douglas; project manager: Fleetway House Limited; developer: Barclays Property Holdings Limited.

Selected subcontractors and suppliers
Curtain wall: Schüco; c/w installation: Parker Contracts, Capital, Roger Smith; c/w sealant: Delta; floor tiles: Domus; pavers: Marshalls; suspended ceilings: Burgess; sanitaryware, cubicles: Armitage Shanks; ceramic tiles: H&R Johnson; ironmongery: Elite; carpet: Milliken; roof: Euroroof; roof insulation: Dow; lifts: Otis; scenic liftcars: Olympic Finishes; lighting: Thorn (int), Holophane (ext), Commercial Lighting Systems (bridge downlights); sealants: Adshead Ratcliffe; Zolatone paints: Eversprayline; ductwork: Lindab; syphonic drainage: Fullflow; RC frame: Structural Concrete Contractor; carpark liftslab: Hevilifts; cladding: Trent Concrete, Prince Cladding; structural steel: Glosford; atrium roof glazing: Mellowes Archital; brise soleil: Avenue Technology; street awnings: Merlin; window blinds: Faber; insulation: RIW; Knauf drylining: Monosystems; handrails: Waleswood; access floors: Hewetson; plumbing: Briggs & Forrester; windposts: Britannia, JDS; loading bay louvres: Kingfisher; steelwork painting: Garness & Pearson; floor paint: Veitchi (East); demountable partitions: Triplan; flexible flooring: Carpetronic; mastic: West Anglia Insulations; soft landscape: Frost; boardwalk: Unilock; block paving: Blockways; surfacing: Spadeoak; Fibre-Dec surfacing: Colas, May Gurney; service beams: Trox Technik; automatic barriers: Frontier Pitts; turnstiles: Mayor; water feature: Lightwater International; cleaning cradles: Cradle Runways; bms: Serck Controls; strongroom: Rosengrens Tann; sectional doors: Amber Doors; fit-out partitions: RD Fire Protection; carpark crash barriers: Berry Systems; concrete: Pioneer; flues: Selkirk; AHUs, chillers: York International.

blue and dove grey, the soft colours combined with delicate steelwork evoke an almost Regency calm.

As work is increasingly dictated by the electronic screen, the real experience of life grows in importance. It is now increasingly recognised that green office buildings – which give staff some contact with the real world of wind, rain and sun – lead to enhanced levels of staff performance. The naturally lit and ventilated office generates less absenteeism through sickness or poor morale – in other words, green offices not only conserve energy, they help reduce company staff costs. In fact, the one or two per cent increase in staff productivity recorded by studies of green offices pays for the annual energy costs of a typical building. For companies such as Barclays, the procurement of green buildings is a question of good management as much as saving energy.

Brian Edwards is professor of architecture at the University of Huddersfield and author of Towards Sustainable Architecture: European Directives and Building Design.