Projects for Helicopter Stations in Central London Area

INTRODUCTION

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The design problem of a Helicopter Station in the Central London area was set to thirty students in their final year at the Department of Architecture, University College, London, in the Lent Term of the session 1955-56 The architectural problem posed by the provision of the very large area of landing space required under present operational conditions, with its attendant problems of the ground and air approaches and the use of the covered space provided by the flight platform, was one well worthy of study The design of such a massive building as this entails, to fit comfortably in the relatively small scale of present day London, poses a considerable architectural problem, to which as yet no entirely satisfactory solutions have been offered

The object of the programme therefore, was to take the requirements as they are at present defined and to test the architectural possibilities It was hoped, moreover, in doing so that some contribution might be made to the general body of thought on the design of urban Helicopter Stations and that by exploring the likely accommodational and planning requirements a clearer idea might be obtained of the extent, scale, and possible form of suitable structures Students were free to choose their own sites Many, including the authors of two of the illustrated schemes, selected the area of Bankside opposite Somerset House , others chose areas of railway sidings outside Paddington, Euston and Victoria Stations Two or three more adventurously chose to place their flight platforms over Blackfriars Road and Railway Bridge One of those illustrated is an outstandingly successful example of a scheme of this type Minimum requirements for the flight platform were a single strip 400 ft long by 150 ft wide, plus a parking area for four machines at 150,000 sq ft each However, in view of the intensity of traffic required by the programme (40 operations per hour) many schemes aimed at providing separate landing and take-off strips in at least two directions , one of the illustrated schemes in fact permits landing and take-off for three different wind directions

It should be emphasized that the programme aimed at being entirely realistic, in the rather limited sense that the operational requirements were based on commercially operated helicopters as they exist today or are likely to exist within the next ten years or so, and no attempt has been made to anticipate the development of machines requiring smaller landing and take-off areas

The terms in which the design problem was put to the students is given below Following it are given three representative solutions described by their authors, together with illustrations

https://doi.org/10.1017/S2753447200004108 Published online by Cambridge University Press

The Design Problem

The subject of the design of helicopter stations is one about which much has been written and spoken, but few actual projects drawn up Operational requirements have been carefully defined however and are clearly set out in the Ministry of Transport & Civil Aviation's pamphlet CAP/132 ' The Planning of Air Stations for Single Engined Helicopters ' shortly to be published by H M Stationery Office Since no precedent exists as yet for this type of structure, the subject calls for considerable original thought and imagination

It is intended that the station in this case should be a major one in Central London handling traffic to the principal provincial cities within a radius of 250 miles Although the only complete design data yet available is for single engined machines, in fact, helicopter operations on a large scale are unlikely to become economic until in approximately 8—10 years time, a twin-engined machine capable of carrying at least 30 passengers is available for service The station will need to be designed with these larger machines in mind The peak handling capacity of the station will be 40 operations per hour (One operation comprising landing—disembarking passengers—refuelling—embarking passengers—take-off) The terminal buildings will therefore have to be capable of handling a total of 2,400 passengers per hour, or about the hourly number handled by the main line railway station of a town of 100-150,000 inhabitants

Essentially the planning problem, like that of any transport building, is that of circulation The building, like a railway or coach station, is particularly a point at which passengers transfer from one means of transport to another, and should be planned so that this operation may be carried out with the minimum of effort and inconvenience Since speed will be the essence of helicopter travel to the passenger, and a rapid turn round of machines an economic necessity to the operating company, it is more than ever important that the process of disembarking and embarking passengers should take place swiftly and smoothly

The sequence of operations as far as the passenger is concerned is likely to be as follows—' on arrival at the Rotor Station the passenger purchases a ticket, if this has not been done in advance, and registers luggage he does not propose to carry himself The booking-clerk would hold a copy of the ticket and make up the passenger list The passenger would then go to the waiting space (where a refreshment bar would be available) and which would give a clear view of an indicator board showing the number of the next service to depart and the points served When the departing helicopter was ready, an announcement would be made over a loudspeaker asking passengers to assemble at the departure gate The gate would then be opened and passengers conducted to the waiting helicopter by a traffic clerk to have their tickets checked against the passenger list by the aircraft flight attendant '(1)

Some form of covered way for use in rainy weather between terminal building and helicopter waiting area would be desirable

The procedure for arriving passengers would be even simpler ' The flight attendant collects disembarking passengers tickets from them and

(1) Journal of the Helicopter Association of Great Britain Vol 5, No 1 April—May—June, 1951, pp 227 et seq —' Rotor Stations—The Schedulee Operators Point of View Paper by R H Whitby

directs them to the exit gate, which should be clearly marked The baggage loader takes registered baggage from the holds and loads oncoming baggage The layout of the passenger Terminal building should be such as to allow the segregation of outgoing and incoming passengers (2)

Latest trends of thought on the subject favour the view that the Rotor Station should be a structure of not more than 3—4 storeys high with the storeys below the flight deck given over to some revenue-producing use not incompatible with the functioning of the Station, such as car parking or warehousing Obviously only those parts of the building concerned with flight control and passenger embarkation should be allowed to rise above the level of the platform

Site

Other than rooftop stations on existing buildings, the most suitable possibilities for siting are likely to be as follows —

(1) *Over the river Thames*

A platform on piers or pontoons attached to a bridge or the embankment

(2) *Over railway lines*

A suitable site could be found over the large areas of railway lines at the approaches to one of the main line terminals

For the purposes of this subject students are to choose their own sites in either of these two alternative situations

Accommodation Requirements

(a) Flight Platform

(i) *Landing and Take-off strip* Minimum requirements are a strip 400 ft long by 150 ft wide orientated in the direction of the prevailing wind, and providing a 1 10 clearance slope at both ends of the strip and a 45° clearance angle for 100 ft distance at either side of the strip

(ii) *Parking area* Waiting space for four helicopters should be provided close to the passenger Terminal building, based on an area of 15,000 sq ft per machine, for embarking and disembarking passengers An additional span of 15,000 sq ft will be required to be kept free for emergency repairs and maintenance

N B No workshop or storage facilities need be provided for helicopters, the assumption being that routine maintenance will be carried out at the smaller airports around London, space in the central area being too precious

(b) Passenger Accommodation

(i) *Concourse* The principal requirements of the passenger terminal building will be a spacious concourse, giving access to all parts and subdivided for incoming and outgoing passengers

It will include

(*a*) *Booking office, 450 sq ft*, with four booking windows, and linked by service circulation to the airline offices

(*b*) *Inquiry office, 250 sq ft* Adjacent to booking office with counter and some waiting space

(*c*) *Bookstall*

(2) Op Cit

(*d*) *Four small shops*
(*e*) *Ten public telephone kiosks*
(*f*) *Public lavatories* suitably subdivided for arriving and departing passengers
(*g*) *Waiting space* Not necessarily a separate room, but comfortable seating protected by draught screens
(*h*) *Arrival and departure indicators* situated in a key position
(*i*) *Arrival and departure gates*, a total of four gates for arriving and four for departing passengers providing clearly defined points for the assembly of passengers
(*j*) *Left luggage office, 600 sq ft* Accessible to both arriving and departing passengers
(*k*) *Baggage counters* 30 ft long with space behind for temporary stacking of luggage awaiting loading or collection One on the arrival side and one on the departure side of the concourse
(*l*) *Restaurant* A good quality restaurant for 60 persons with kitchen and all necessary ancillary accommodation
(*m*) *Refreshment room* with bar and seating at tables for 100 persons Sited to give a view of the indicators *N B* Both (*l*) and (*m*) above should be accessible from both sides of the concourse

(*c*) *Approaches*

The approaches to the station should be imaginatively planned for the large amount of traffic using the station The majority of passengers will arrive at or leave the station by taxi or private automobile A generous picking up and setting down curb should be provided based on the assumption that the volume of traffic will be of the order of 600 vehicles per hour at peak periods Space for a rank of ten taxis is required and the forecourt to the station should provide temporary parking space for 50 cars

Access to passenger concourse to other forms of transport, *e g*, tubes and buses will depend on the circumstances of each individual scheme

(*d*) *Office Accommodation*

The exact requirement for office accommodation cannot be foreseen, but a total of approximately 10,000 sq ft should be set aside for all purposes The offices will require direct access

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D V Hewitt

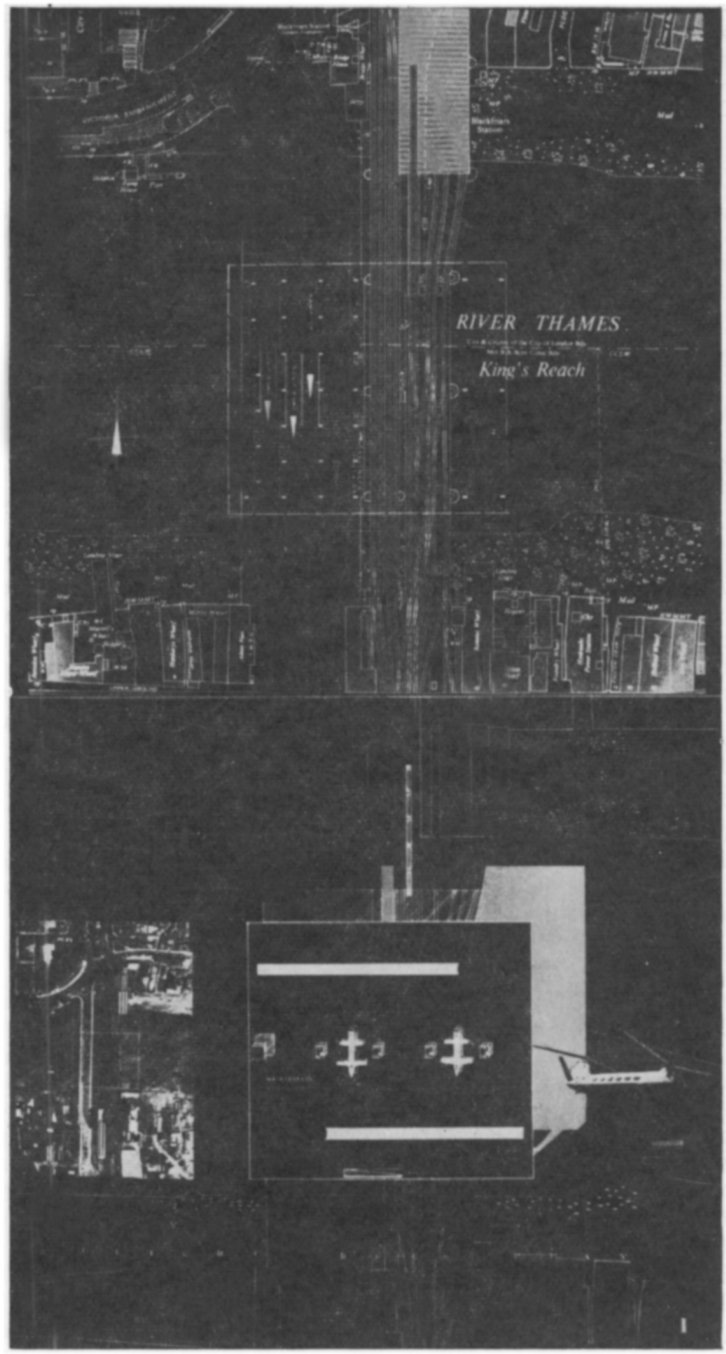
Site

The site was chosen above the level of two railway bridges and road bridge over the River Thames at Blackfriars to provide an uninterrupted approach up and down the river for the landing of helicopters

The Station would be constructed at this level to allow for through traffic passing over the road bridge with a clearance height for London Transport double-decker buses The bridges would be in this way united into one composition with most of the railway lines obscured from view, at the same time a helicopter station would be provided in a prominent position dominating the buildings within its environment

Transport

Transport facilities, buses, tubes and trains are close at hand Blackfriars Underground Station being located on the North Embankment of the bridge



Hewitt *Site Blackfriars*

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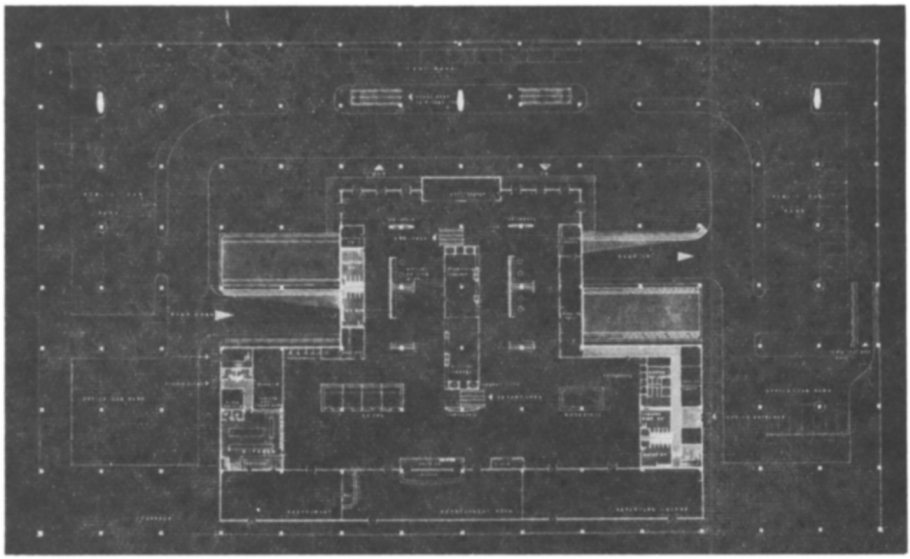

Hewitt *Car Park*

New Road Bridge

The existing road bridge is replaced by a new one consisting of two outer lanes for through traffic, separated by two scissor ramps serving inward and outward to and from the Station Pedestrian steps are provided to lead directly from the pavement level to the forecourt at concourse level This road solution enabled excessive spans of beams to be avoided by placing columns at 66 feet centres between the main traffic lanes

Car Park

Provision was made on the forecourt for the parking of 50 public cars, and additional space was allowed for a taxi rank, staff car park, and kitchen delivery area

Concourse

The concourse 30 ft in height is subdivided for arriving and departing passengers with the public restaurant, snack bar and the departure lounge being positioned along the west facade to obtain a very fine view of the river and embankment area The passenger access to the flight deck is by means of a subdivided arrival and departure gallery, from which staircases lead to a position alongside each parking space provided for the helicopters

On this upper floor level of the concourse the administrative offices of the station are located, providing direct access to the gallery control tower and all sections of the station Luggage lifts serve each parking bay , the luggage being transfered to the main lifts at the gallery level

Heating

The heating of the terminus would be by means of preheated water pumped directly from the existing Power Station situated close to the bridge on the South Bank of the river

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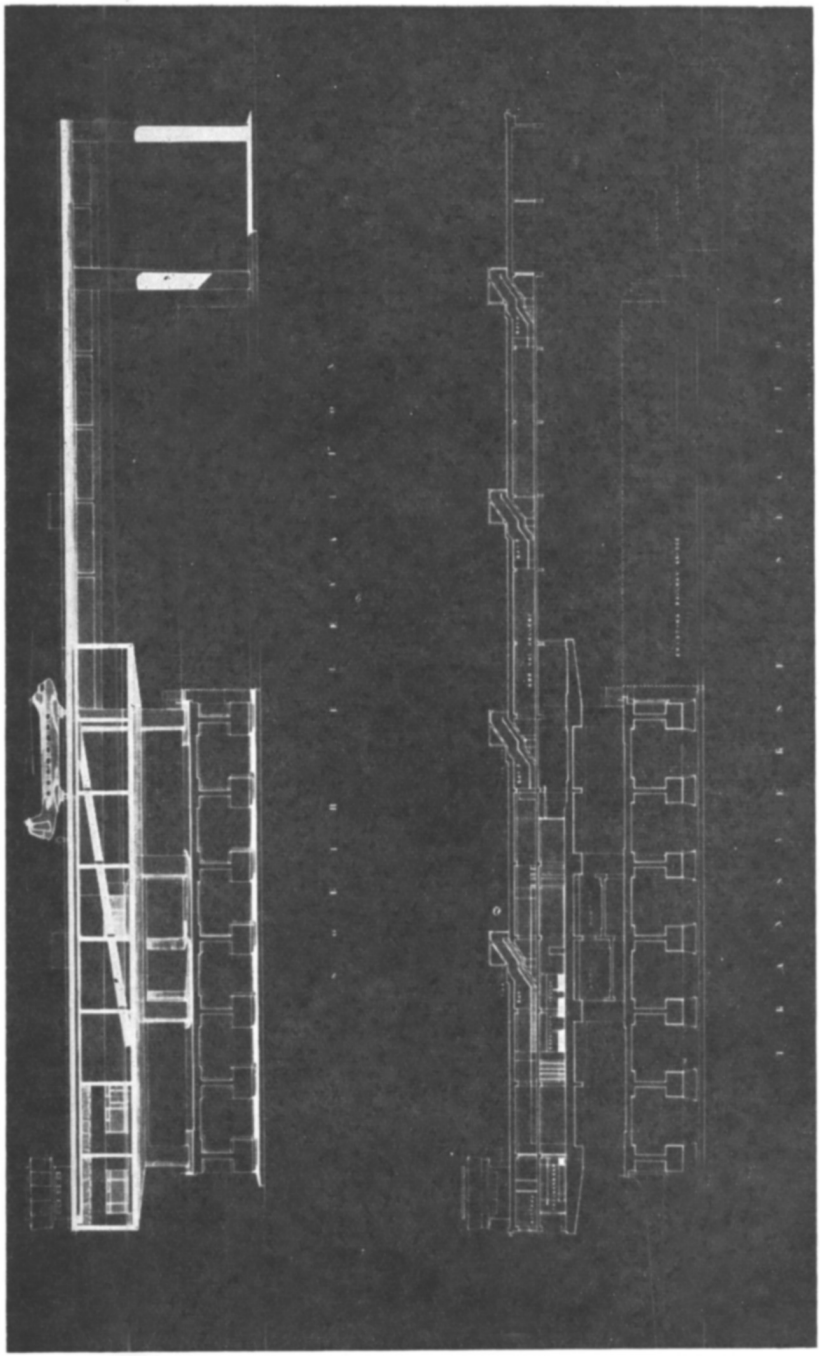

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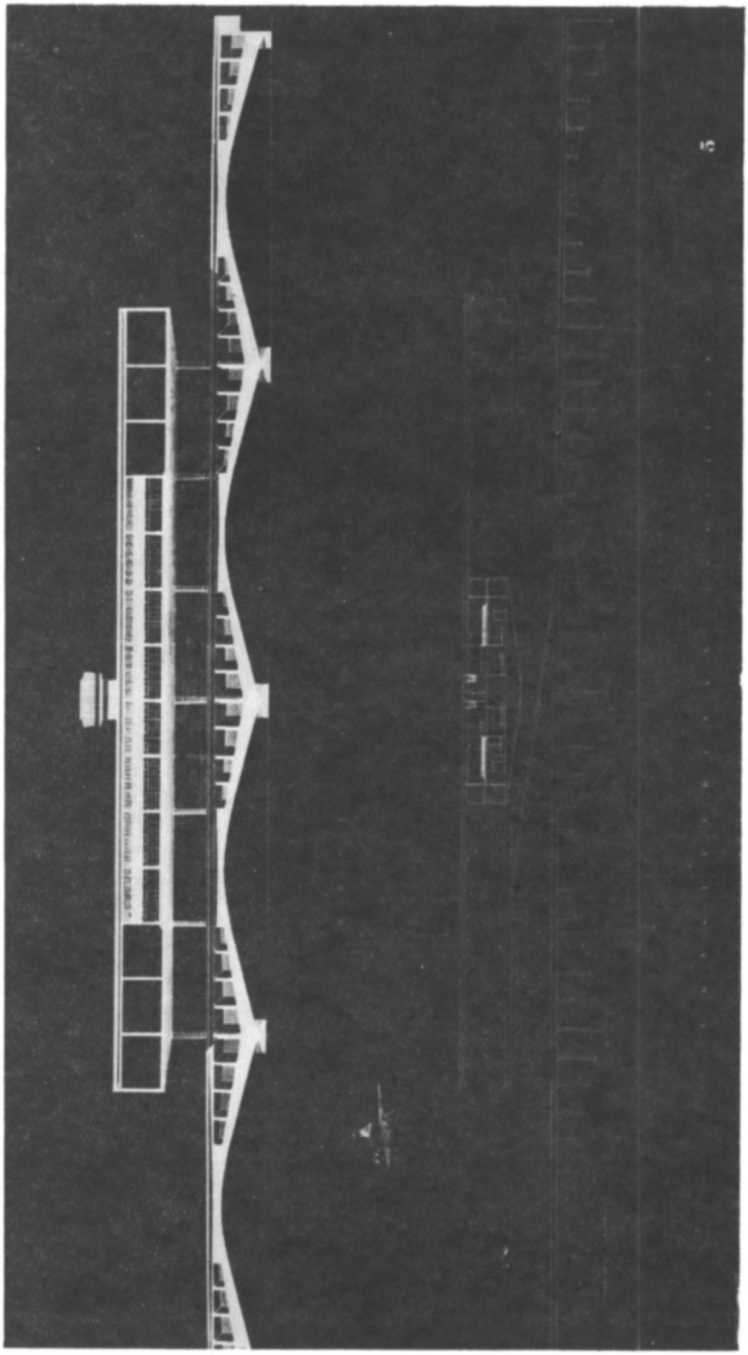

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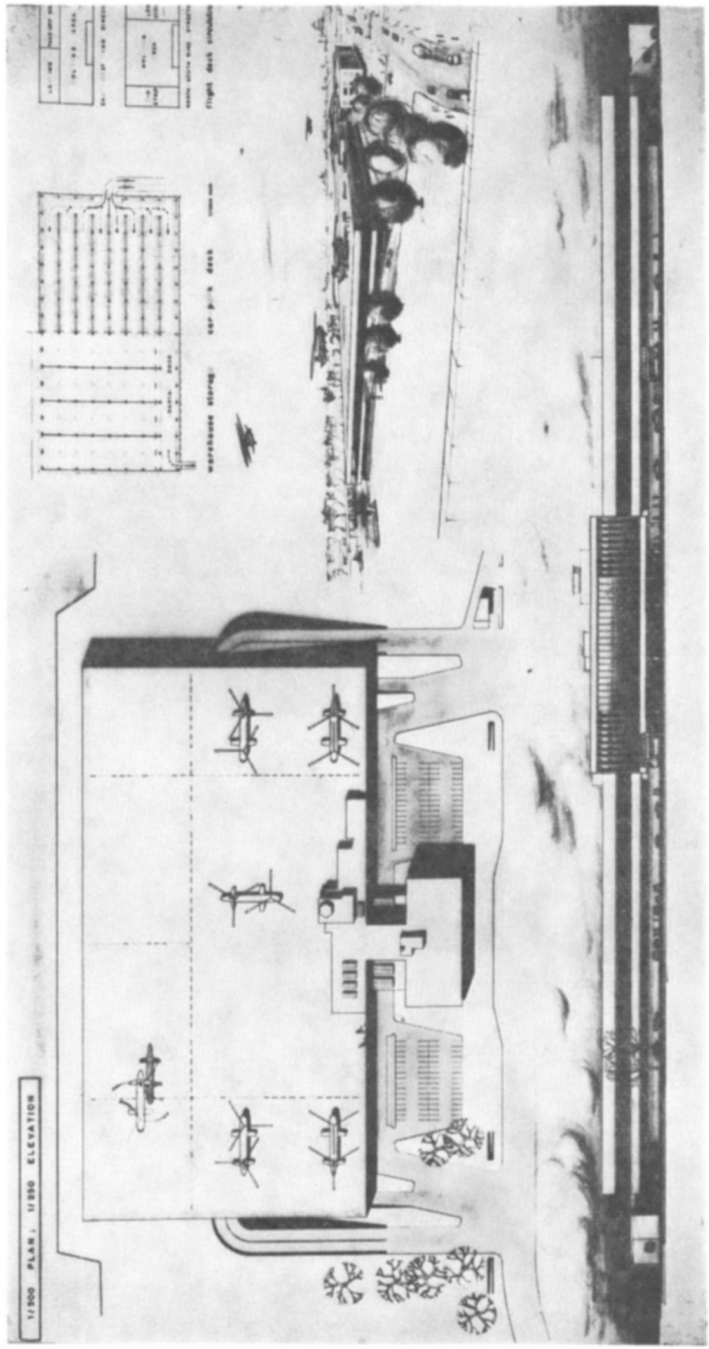

Site Bankside

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Flight Platform

The flight platform consists of two parallel runways 165 × 528 ft, one for helicopters taking off and the other for landing The runways are divided by a parking strip 132 × 528 ft which is subdivided into four parking bays and a maintenance area The helicopters are refuelled by means of refuelling points provided at each parking bay The fuel being piped to subsidiary tanks from the main storage tanks on the South Bank

ROBIN C PRATT

Site

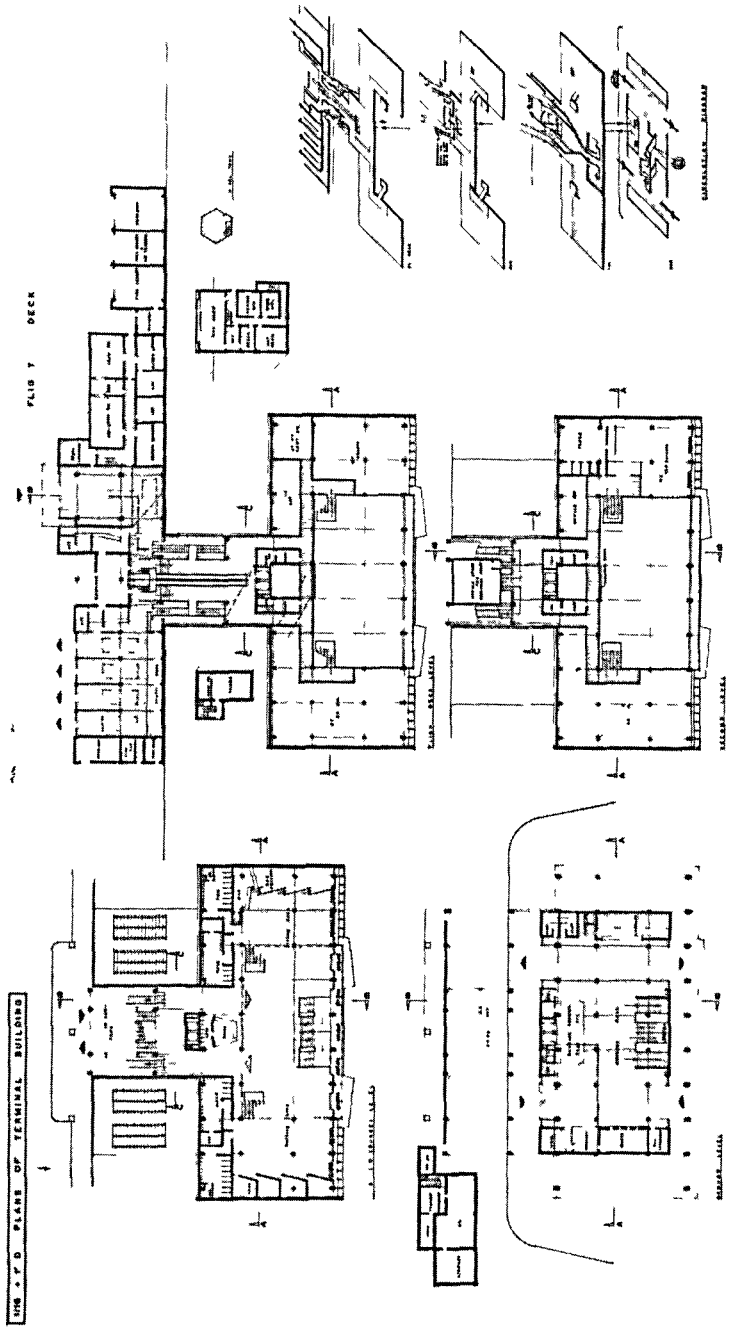
The site chosen for the project was that between Waterloo Bridge and Blackfriars Bridge on the south bank of the Thames Apart from the excellent aircraft approaches offered, the site is centrally situated both for passengers and surface transport Although not served at present by Underground, it was assumed for the purposes of the scheme that the existing Holborn-Aldwych line would later be extended to Waterloo, and tube station access is provided from the Terminal with this in mind The immediate locality is non-residential and there exists already a fairly high noise level Furthermore the area is due for development under the 1947 County of London Plan and so the student felt justified in re-planning the whole site to his requirements Use has been made of the L C C 's current proposals to modify the road layout to the south of Waterloo Bridge

Planning of Main Elements

Provision is made for two landing and two take-off strips (150 ft × 400 ft) serving north/south and east/west approaches, and a holding area accommodating four twin rotor machines Measuring 800 ft by 400 ft, the platform is encircled by a 10 ft wide safety bank which slopes outwards to a height of six feet Working on a basis of landings and take-offs at $1\frac{1}{2}$ min intervals and a 'turn-round' period of six minutes, the handling capacity of the station is forty operations per hour In order to justify the virtual sterilisation of such a large land-area, a covered parking space for 1,500 cars is provided with four-lane entry and exit ramps Beneath the car-park deck and at ground level, a total of 280,000 sq ft of warehouse storage space is planned with riverside unloading facilities and access for commercial road vehicles

Terminal Building

The terminal building is segregated from the main structure and linked only by an escalator and stair bridge serving both the passenger and control buildings on the flight platform, and access to the car-park deck Arrival and departure circulations are planned either side of the centre-line of the building although the circulations can intermingle in the Passenger Concourse so that full use may be made of all its facilities The majority of passengers, *i e*, those arriving by road, alight from their vehicles under a covered way and enter the Booking Hall (ground level) at the rear of the building Those travelling by Underground arrive inside the Booking Hall whilst the street front entrances are used by pedestrian traffic After booking their flight and depositing their baggage, passengers make their way up to the Main Passenger Concourse at First Floor level Facilities include Restaurant,



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Refreshment Bar, Lavatories, Bookstalls, etc, and Waiting Space After announcement of their flight on Indicator Board, passengers proceed up to Departure Gates on the Flight Platform via the Escalator Link Meanwhile baggage is conveyed upwards by Lift and thence by Conveyor Belt along Escalator Link to Baggage Handling Hall where it is transported to waiting aircraft by electric tenders Other accommodation at flight platform level includes Customs and Passport Section for continental flights, Flying Control, Air-Crew and Ground-Crew accommodation, Workshop, Aircraft Tender Park and Fire and Crash equipment A total of 9,740 sq ft of Office space is planned on either side of the Concourse at Second and Third Floor levels

Brand

A Graham Brand

The Heliport is designed to provide a fast service for businessmen travelling from London to the provinces and returning within a few days and is not intended to take the place of the present helicopter service to London airport All servicing would be carried out at a distant airport such as London

The site at Bankside was chosen for the following reasons

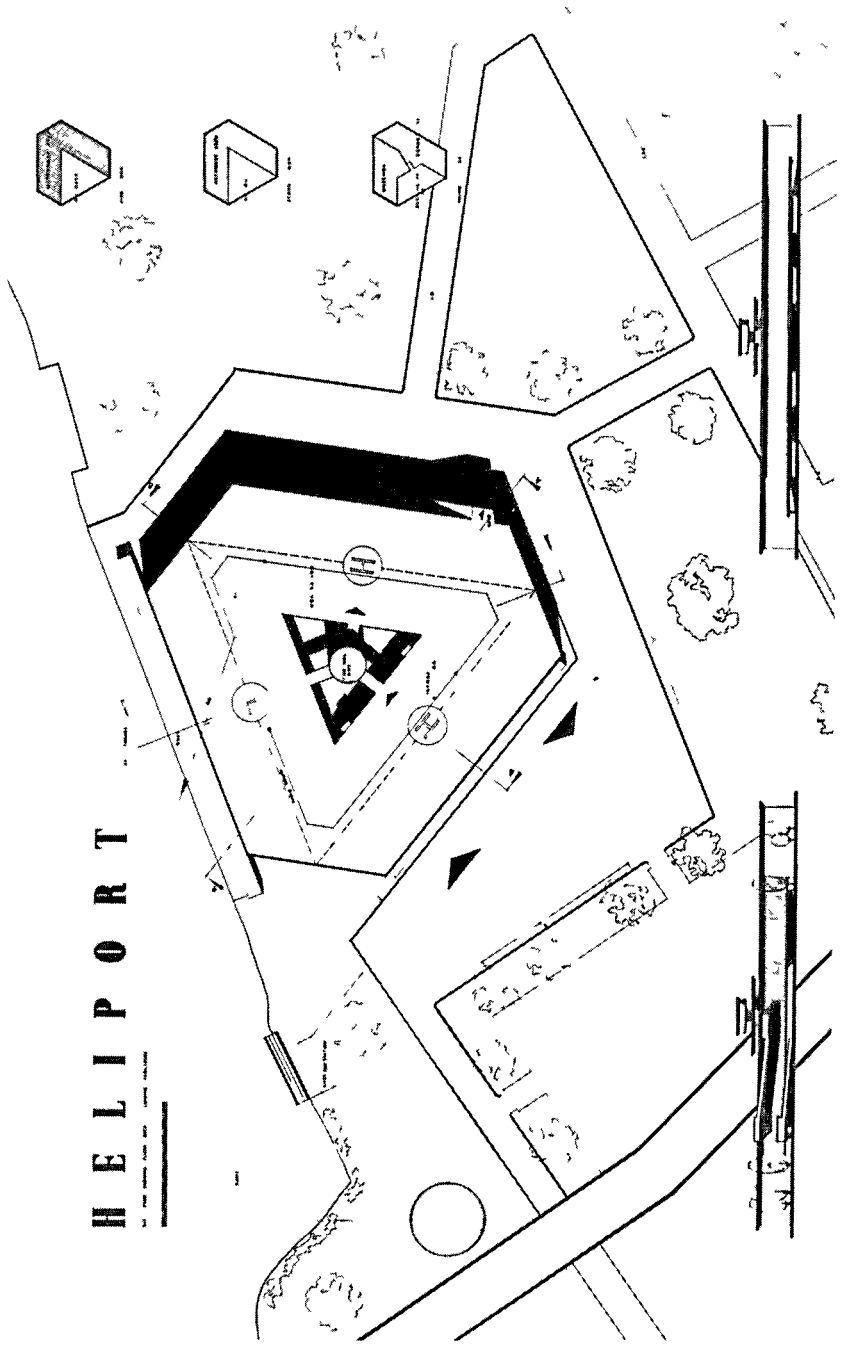
(*a*) close proximity to Waterloo Station and the Underground Service

(*b*) Easy access to nearly all of London along reasonably traffic free roads

(*c*) Uninterrupted angles of approach due to the wide sweep of the river

(*d*) Noise would cause less annoyance in this area due to the open spaces around the site

The flight deck determined the planning of the building which is designed on a triangular grid One third of the plan is given over to passenger circulation and amenities The arrival and departure circulations are clearly defined with escalator and barriers Booking offices and luggage offices are on the ground floor, with main concourse and restaurant on the first floor Escalators lead from here to the flight deck which consists of three landing strips forming a triangle with a light well, passenger access block and control tower in the centre The landing procedure, which is interchangeable according to the wind direction is as follows —A helicopter landing on one



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strip taxis to the next and unloads passengers and luggage Luggage for departure is loaded and the helicopter then taxis to the third strip to take on passengers It is then in a position to take off on the first strip again Helicopters can be parked side by side on the two strips not actually used for take-off and landing Luggage lifts run down the light well to the offices directly below Fuel pipes with covered connections on the flight deck also run down the well to storage tanks in the basement, the fuel being pumped up when required

The remaining area of the triangular plan is given over to car parking and warehousing, with a wharf on the river side of the site Both internal and external ramps run from the ground floor to the flight deck and are for the use of cars, warehouse trucks and any flight deck traffic The car parking and warehousing part of the building are connected with the heliport only inasmuch as they provide a revenue to a building that requires so much waste space around it and warehousing is the traditional industry of this stretch of the river

Experiences of a technician in learning to fly a helicopter

In Vol 10 No 2 we announced details of the first Alan Marsh Award which was made to Mr M A P Willmer, D C Ae , A R C S , B Sc , and took the form of a short course of helicopter flying at Air Service Training Ltd , Hamble We asked him to record his impressions of the experience for the benefit of all members

* * *

This report on my experiences at Air Service Training Ltd in the Autumn of 1956 is divided into three sections The main section deals with the dual tuition and passenger flying , it is supported by a subsidiary section on the Ground School and some comments on my position as a non-pilot on a pilots' course My stay at Hamble lasted nearly three weeks The flying time consisted of five hours under tuition and roughly two and a half hours as a passenger

On my arrival, the contents of my course were discussed and my flying instructor and I decided that as I was a complete novice to flying it would be in my own interest to have some helicopter air experience as a passenger before attempting to handle the controls I was, therefore, taken up with other members of the course who were just starting with me, whilst they gained actual experience of feeling the effects of the controls, and in this way I obtained about 1½ hours of flying I felt that this time was extremely helpful for it afforded me not only the opportunity to become acquainted with the sensation of being in a helicopter, but also with the kind of mistakes I should make later

Thus, I went forth to my first flight at the controls with some idea of the errors that I was about to commit and many resolutions on how I should prevent their occurrence The memories of this first flight, which lasted 35 minutes, are unforgettable The instructor put the aircraft in steady level flight at 45 kts and then gave me control of the cyclic stick At first I held the stick in the same position , the forces were slight since the stick was trimmed for the airspeed at which we were flying For a short time the aircraft pursued its course and I relaxed a little However, it was not long before a disturbance occurred Resolutions forgotten, I chased after it until, from our steady 45 kts level flight, we were descending in the vortex ring state The instructor put the helicopter back again into level flight and I had another attempt , this time with a little more success

The main difficulties were judging the attitude of the helicopter and appreciating the time lag in the air speed indicator The former was the harder to overcome as there was so little that could be used as a datum The front of the helicopter, a Hiller 12C, was made of perspex with one horizontal bar near the midway position

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