TO HILLS AND WOODED AREAS

NICE HILLS BUT VIEW OF S.R. 57 NOT SO GOOD

EXCELLENT VIEW ALONG RUNWAYS AT CREST HILLS AND CEMETARY

EXCELLENT VIEWS FROM NE TO SE AT MODERATE HILLS, WOODED AREAS, AND CEMETARY HILL

BAD VIEWS TO HIGHWAY, RAILROAD YARD AND OLD TERMINAL COMPLEX

TO LOW HILLS AND GREEN AREAS

TRAFFIC ON HIGHWAY 41, BUT SOME COMPENSATION OF SEMI-WOODED AREA

TRAFFIC ON HIGHWAY 41

VIEWS OUT FROM SITE
**SPACE SUMMARY**

1990

<table>
<thead>
<tr>
<th>Description</th>
<th>1,500,000</th>
<th>675</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual passenger movements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(probable)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak hour passenger movements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curbing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passenger car spaces</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taxi and limousine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Busses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Linear Feet</td>
<td></td>
<td>1,350</td>
</tr>
<tr>
<td>Parking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long term (public)</td>
<td>1,200</td>
<td></td>
</tr>
<tr>
<td>Short term (public)</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>Employee</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Rent-A-Car (ready)</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>Rent-A-Car (storage)</td>
<td>550</td>
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<tr>
<td>Total spaces</td>
<td>2,170</td>
<td></td>
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<tr>
<td>Airline Space</td>
<td></td>
<td></td>
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<tr>
<td>Terminal gates</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Holding areas--S. F.</td>
<td>11,160</td>
<td></td>
</tr>
<tr>
<td>Ticket Counters--S. F.</td>
<td>2,600</td>
<td></td>
</tr>
<tr>
<td>Operations--S. F.</td>
<td>18,000</td>
<td></td>
</tr>
<tr>
<td>Baggage claim area--S. F.</td>
<td>3,000</td>
<td></td>
</tr>
<tr>
<td>Baggage area--S. F.</td>
<td>3,000</td>
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</tr>
<tr>
<td>Maintenance area--S. F.</td>
<td>4,900</td>
<td></td>
</tr>
<tr>
<td>Storage space--S. F.</td>
<td>2,000</td>
<td></td>
</tr>
<tr>
<td>Passenger Areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>Ticket lobby--S. F.</td>
<td>4,000</td>
<td></td>
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<tr>
<td>Waiting area--S. F.</td>
<td>7,500</td>
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<tr>
<td>T.V. lounge--S. F.</td>
<td>600</td>
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<tr>
<td>Restaurant--S. F.</td>
<td>9,000</td>
<td></td>
</tr>
<tr>
<td>Cocktail bar--S. F.</td>
<td>2,000</td>
<td></td>
</tr>
<tr>
<td>Snack bar--S. F.</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>Magazine shop</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>Gift and sweets shop</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>Insurance</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>Post office</td>
<td>900</td>
<td></td>
</tr>
<tr>
<td>First aid</td>
<td>800</td>
<td></td>
</tr>
<tr>
<td>Public toilets</td>
<td>2,400</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Rent-A-Car Space</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Operations--S. F.</td>
<td>1,600</td>
</tr>
<tr>
<td>Ticket counter--L. F.</td>
<td>100</td>
</tr>
<tr>
<td>Concourse--S. F.</td>
<td>23,000</td>
</tr>
<tr>
<td>Corridors, vestibules, entrances, display area--S. F.</td>
<td>10,900</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Airport Management</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport administration--S. F.</td>
<td>2,000</td>
</tr>
<tr>
<td>Toilet area--S. F.</td>
<td>60</td>
</tr>
<tr>
<td>Custodian lockers and breakroom--S. F.</td>
<td>300</td>
</tr>
<tr>
<td>Storage and equipment room--S. F.</td>
<td>200</td>
</tr>
<tr>
<td>Maintenance tech. repair area and breakroom--S. F.</td>
<td>300</td>
</tr>
<tr>
<td>Repair shop and storage--S. F.</td>
<td>620</td>
</tr>
<tr>
<td>Service docks and waste disposal--S. F.</td>
<td>1,500</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fire/Security Dept.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief office--S. F.</td>
<td>100</td>
</tr>
<tr>
<td>Control and observation room--S. F.</td>
<td>300</td>
</tr>
<tr>
<td>Kitchen/lounge--S. F.</td>
<td>450</td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>20 seat classroom--S. F.</td>
<td>360</td>
</tr>
<tr>
<td>Toilet/shower area--S. F.</td>
<td>300</td>
</tr>
<tr>
<td>Garage area--S. F.</td>
<td>4,400</td>
</tr>
<tr>
<td>Maintenance area--S. F.</td>
<td>1,000</td>
</tr>
<tr>
<td>Parts and equipment storage--S. F.</td>
<td>800</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sub-total--net floor area</th>
<th>121,310</th>
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</thead>
<tbody>
<tr>
<td>Walls (3% N.F.A.)</td>
<td>3,639</td>
</tr>
<tr>
<td>HVAL (10% N.F.A.)</td>
<td>12,131</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Circulation (programmed in)</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Total (gross) square footage</th>
<th>137,320</th>
</tr>
</thead>
</table>
COST ANALYSIS

COST ESTIMATE

A. Building costs (137,320 S. F. @ $55/S. F.) $7,552,600
B. Fixed equipment (12% of A) 906,312
C. Site development (26% of A) 1,963,676

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D. Total construction (A+B+C) 10,422,588

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E. Site acquisition (248 acres x $1100/acre) 272,800
F. Moveable equipment (8% of A) 604,208
G. Professional fees (6% of D) 625,355
H. Contingencies (10% of D) 1,042,259
I. Administrative costs (1% of D) 104,226

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K. Total budget required (13,071,436) $13,072,000

FINANCING CONSIDERATIONS

Airports and airport improvements are generally financed by one or more of a
combination of five methods. These five methods are (1) Financing by use of Accumulated Funds, (2) Financing by Revenue Bonds, (3) Financing by General Obligation (G.O.) Bonds, (4) Grants from State and Federal Agencies such as the Indiana Aeronautics Commission, the FAA or ANG, and (5) Financing by a lease back agreement.

The advantage of financing through the use of Accumulated Funds is that construction can proceed shortly after the need for a facility is established because the funds required for construction are already available. Consequently, the airport sponsor is not dependent upon the current state of the bond market for financing its projects.

This type of financing, however, is generally suitable only for small or medium size projects. Most airports are not able to accumulate sufficient funds to pay for large expansion projects without the use of the bond market and/or State or Federal Grants.

Airport Revenue Bonds are bonds secured by the revenue of the Airport. They have the advantage for a public authority that they usually can be sold without submitting them to taxpayer approval. This is because they will presumably have no effect on taxes since they will generally be repaid entirely out of airport revenues.

Revenue bond issues present a number of problems. The major one is that they are more expensive, i.e., have higher interest rates than financing by tax backed measures. This is equitable since revenue bonds have more risk involved in them than tax backed financing measures and it is generally undesirable for a
public agency to pay such increased costs if there are alternative methods of financing.

Another problem is that revenue bonds are extremely sensitive to market interest increases. At the present time, the market for airport revenue bonds is not very strong, due to extremely high interest rates and there is extreme difficulty in promoting issues met by revenues only.

A final problem is that revenue bonds require unusually large reserves if there are no firm guarantees. These can call for the net income available for debt service to range from 1.25 to 1.5 times the annual debt service requirements. This money is required to be put in a fund to be used only for payment of the bonds' principal and interest in the event that net revenue in any particular year is not sufficient to meet these payments. This requires that money which might be useful elsewhere be tied up in a reserve fund, and also requires that an airport earn considerably more than its debt service requirements from virtually its first year of operation. Experience has shown that many successful businesses operate at a loss for the first year or two while operating volume is built up. While this practice is quite common, it is generally not favorably received for revenue bond financing; in certain cases, however, it may be acceptable to a bond house.

For example, if an average of the first five years of revenue and expenses will yield enough to meet the debt service payments, an arrangement can be worked out by borrowing additional capital to make payments in the first few years or by paying interest only on the early serial bonds. Another possibility would be a
serial repayment plan with lower payments in the early years and higher payments in the later years of the debt retirement program.

General Obligation (G.O.) Bonds are bonds secured by the taxing power of the municipal authority. Their major advantage is that they carry the lowest rate of any type of borrowing. Thus, the costs of financing are reduced considerably when this type of financing is used.

A disadvantage of G.O. Bonds is that it is often necessary to request a tax increase from the taxpayers by a referendum in order to have enough money to pay for them. In these days of ever increasing taxes, particularly local property taxes, voters are often understandably reluctant to vote for a tax increase. This is especially true of facilities such as airports where, while the value to the community is obvious, it is difficult for the individual voter to see, in terms of dollars and cents what the airport will mean to him.

The financing by a lease back arrangement will allow for financing similar in tax effects to General Obligation Bonds. This latter system results in a lease of land to a third party who finances and constructs improvements for the use of the Airport sponsor or a tenant and the improvements thereon are leased back to the municipality at rates which are less than the tax levy for airport purposes.

In view of the above discussion, the theoretical and ideal way to finance revenue producing municipal facilities would be to finance with G.O. Bonds which require no tax increase, or a small immediate tax increase with the facility itself earning enough shortly after its opening, to pay for its costs of operation and debt service.
This procedure saves money because of reduced interest rates as compared with revenue bonds, causes minimum taxpayer discontent, and provides the public with the desired, self-supporting facility without the added burden of revenue bond reserve funds in the early years of operation. However, this is often not possible because of State laws and other factors affecting individual airports.
BUILDING TYPE STUDIES

Building type studies will be an analysis of various passenger terminal facilities under the following classification criteria:

1. Passenger handling concept
2. Vertical distribution processing type
3. Aircraft parking type and apron layout
4. Passenger conveyance system
5. Baggage claim conveyor type
6. Auto parking system.

Further analysis will be made to illustrate enplaning and deplaning passenger circulation, both in plan and section, and automobile circulation, curbing system and parking circulation.

Overall runway layout may or may not be illustrated since runway configuration is a secondary determinant on the passenger terminal design concept.

Structural type may be analyzed, but it is also a secondary determinant.
NEWARK AIRPORT

1. Pier satellite passenger handling system
2. Two-level vertical distribution: with separation of enplaning and deplaning passenger flows.
3. Nose-in aircraft parking in a satellite parking system.
4. Power in, push out jetway passenger loading system.
5. Race track baggage claim conveyors
6. Surface auto parking

5. Terminal 1, plan of enplaning and concourse levels.
6. Terminal 1, plan of deplaning level.
7. Terminal 1, plan of parking and operations level.
8. Terminal 1, section.
Key to Ills. 5 to 8: 1 parking, 2 airline operations, 3 sidewalk, 4 aircraft apron, 5 deplaning road, 6 baggage claim, 7 enplaning road, 8 ticketing lobby, 9 concessions and offices, 10 concourse, 11 hold rooms, 12 airline offices, 13 toilets, 14 snack bar, 15 inter-terminal transfer.
9. Model of one of the three unit terminals showing the enplaning road (above) and the deplaning road (below).
10. Model of the interior main circulation space with enplaning curb at the right and an above-grade passage to aircraft satellites at the left.
11. The separation of enplaning, deplaning vehicular traffic and pedestrian access to and from parking areas is a main feature of the new terminal facilities.
KANSAS CITY INTERNATIONAL AIRPORT

1. Gate arrival passenger handling system
2. Two-level vertical distribution processing: simple
3. Parallel aircraft parking in a frontal parking system
4. Power in, power out passenger loading system
5. Race track baggage claim conveyors
6. Structured auto parking
The "Drive-to-your-gate" principle is expressed as an integrated system of four-lane access drive to curbside check-in or departure pick-up at a common curb at KCI. (Arrival and departure occur at separate levels in some airports designed to a similar close-coupling principle.) Further, at KCI, decentralization of ticketing and baggage claim to multiple stations, each serving a minimum number of gates, is essential to the system, as is close-in parking. Shown in section at left is future layered parking structure with walkway over drive to mezzanine loading level that may be required for far-future plane configurations. Control tower sightline limits height of parking and terminal.

Some minimum walking distances: entrance to gate, 65 ft; parked car to gate, 155 ft; gate to bag-claim to exit, 125 ft.
RALEIGH-DURHAM AIRPORT

1. Pier satellite passenger handling system

2. Two level vertical distribution processing:
   simple

3. Nose-in aircraft parking in a satellite
   parking system

4. Power in, push out jetway passenger loading system.

5. Structured auto parking
NATIONAL AIRLINES TERMINAL

JFK International Airport

1. Pier satellite passenger handling system
2. Two level vertical distribution processing; with separation of enplaning and deplaning passenger flows.
3. Nose-in aircraft parking in a satellite parking system.
4. Fixed jetway passenger loading system.
5. Race track baggage claim conveyors
6. Surface auto parking.

National Airlines Terminal
Opening: 1970

I. M. Pei & Partners

20, 21. Landside of the main building.
22. Site plan.
23. Main ticketing and lobby area.
24. Interior of one rotunda satellite.
25. Plan of second level.
26. Plan of ground level.

Key to illus. 25 and 26: 1 enplaning curb, 2 deplaning curb, 3 ticketing, 4 baggage claim, 5 inbound baggage, 6 outbound baggage ramps, 7 lounge and concessions, 8 enplaning concourses, 9 satellites, 10 restaurant.
TRANS WORLD AIRLINES TERMINAL

JFK International Airport

1. Pier satellite passenger handling system

2. Two level vertical distribution processing: simple

3. Parallel aircraft parking in a satellite parking system.

4. Power in, power out as well as power in, push-out jetway passenger loading system.

5. Surfaced auto parking.
DALLAS/FORT WORTH REGIONAL AIRPORT

1. Gate arrival passenger handling system
2. Two-level vertical distribution processing: simple
3. Nose-in aircraft parking in a frontal parking system.
4. Power in, push out jetway passenger loading system.
5. Carousel baggage claim conveyors
Two more modules will be added to the right of the terminal, and a fourth to the left, by the end of the century. The short, medium and long term car parks are designed to take over 2000 cars.
Cross-section through the new terminal. Arriving passengers descend from the airbridge to the ground floor, while departing passengers walk straight through the building on the upper level. Above there are offices and restaurants and on the roof a visitors' terrace.

Upper, the arrivals level with international arrivals and customs barrier flanked by two domestic arrivals areas (above left), baggage racetracks (right), circular meeting point and car rental desks beside the exits to the road. Lower, departures level with check-in desks near the entrance, customs desks and duty-free shops at top and ticket sales counters next to the information desk at right.
Now in construction in the eastern suburbs of the city, Kuwait International Air Terminal is expected to accommodate annual traffic of 1.8 million people by 1985. In the design, the following three points received special consideration.

1. Simple and clear lines of traffic for both cargo and passengers; these lines must promote easy visual orientation.

2. Use of an open plan that will enable the airport to handle the functions imposed on it now, while providing for future expansions to meet the needs of constantly growing air traffic.

3. The airport is being built in the desert. It is important that have a form that gives the airborne passenger a powerful impression of a symbolic entranceway to the nation.

The three main components of the composition are the central terminal building, the finger extending on the major axis, and the two fingers extending to the sides like wings. Future expansion will take the form of underground ways that will link with new independent fingers. The first floor of the terminal building houses the arrival lobby. In the lofty space of the second floor is the departure lobby. On the finger side is a mezzanine restaurant. The great truss framework of the roof above the lobby embraces the flow of the entire airport.

The form born of the integration of the terminal building and the fingers greets the visitor who approaches from the front. The interior spatial composition, which moves inward and upward, establishes a flow that suggests an introduction to the adventure of flying.

While established on the basis of clearly stated interior functions, the exterior form assumes a shape analogous with that of an airplane and in that way conforms to the mood of speed of the jet age.
Passenger terminal and aircraft stands

Passagierterminal und Flugzeugpositionen
Cross-section through the terminal and passenger routes
BIBLIOGRAPHY


**CONCEPT A1**

* Gate Arrival Configuration Concept with combined Holding Areas:
  1. 3 Areas per unit.

* Two-Level Vertical Circulation:
  1. To separate explaining and deplaning circulation.
  2. Airline Operations and Offices on Apron level for direct access.

* Multi-level Parking to minimize walking distances.

* Parking Considerations:
  1. Bus-Shuttle Areas?
  2. Employee Parking Locations
  3. Short Term
  4. Long Term

* Consideration of inclusion of FAA Control Tower to be removed.

* Service Road Alleviates needs to:
  1. Wait Operations Area
  2. Restaurant
  3. Various Concessions
  4. First Aid
  5. Post Office

* Of the functions mentioned above, many vertical circulation, such as preplan elevators are required to:
  1. Amenities
  2. Observation Deck
  3. Restaurant

Escalator Circulation is favorable for passenger movement, lends itself to openness of space.
CONCEPT A1

SECOND LEVEL CONCEPT PLAN

THIRD LEVEL CONCEPT PLAN
CONCEPT A3

TRANSVERSE SECTIONS THRU MECHANICAL AREAS

LOWER LEVEL CONCEPT PLAN

GROUND LEVEL CONCEPT PLAN
CENTRALIZED SERVICE CORE CONCEPTS FOR CONCESSIONS

SERVICE CIRCULATION

DECENTRALIZED SERVICE CORES FOR CONCESSIONS CONCEPT

CENTRALIZED SERVICE CORE CONCEPT FOR CONCESSIONS
LOWER LEVEL CONCEPT PLAN

AREA MASSING - OVERALL LENGTH - 580'-0"

APRON VEHICLE CIRCULATION

DEPLANING CURB AREA

GROUND LEVEL CONCEPT PLAN

CONCEPT A5

SCALE: 1" = 40'

CONCEPT A5

SCALED MASSINGS
CONCEPT A6

TRANVERSE SECTION

GROUND LEVEL CONCEPT PLAN

SCALE: 1" = 50'

RAMP SERVICE CIRCULATION

AIRLINE VEHICLE PARKING FOR:

MECHANICAL AREA

AIRLINE OPERATIONS

AIRLINE OPERATIONS

BAGGAGE AREA

AIRLINE OPERATIONS

AIRLINE OPERATIONS

DEPLANING CIRCULATION

DEPLANING CIRCULATION

VEGETATION TO OFFSET AIRSIDE CHAR

VEGETATION TO OFFSET AIRSIDE CHAR
THIRD LEVEL CONCEPT PLAN

1" = 50'
SERVICE LEVEL CONCEPT PLAN

SCALE: 1" = 20'

YARD DOOR

AIR DUCT

TREATMENT (CONNECTION) YARD

AIR DUCT

SERVICE ROAD
CONCEPT B2

SECOND LEVEL CONCEPT PLAN
CONCEPT B2

THIRD LEVEL CONCEPT PLAN
SECOND LEVEL CONCEPT PLAN

SCALE 1" = 60'
CONCEPT B3

THIRD LEVEL CONCEPT PLAN

SCALE: 1" = 20'
CONCEPT B4
APPROX. STORAGE CAPACITY

200 SHORT TERM

1,200 LONG TERM

SPACE REQUIRED

GROUND LEVEL

SECOND LEVEL

THIRD LEVEL

PARKING GARAGE CONCEPT
GROUND LEVEL CONCEPT

SECOND LEVEL CONCEPT

THIRD LEVEL CONCEPT

PARKING GARA CONCEPT A2
PARKING GARAGE CONCEPT A3
The green space should have a symbolic or philosophical meaning or statements.
1. People immersed in an environment of plants & vegetation.
2. Like an oasis.

Possible transition elements of tubes or tunnels.

Mechanical machine world or environment

Green plant & vegetation environment

To real world of both machine & plants.
CONCEPT B-5

SECTION THRU EXTERIOR GREENSPACE

VERTICAL CIRC TO BE SURROUNDED

TWO LEVELS OF
PEOPLE MOVING.

FOR VERTICAL CIRC
DEVIATIONS OR ELEVATIONS,
ELEVATIONS WATCH FOR
OCCUPANT MOVEMENT NOT
EXCEED MORE ABOVE.
GROUND LEVEL FLOOR PLAN

SECOND LEVEL FLOOR PLAN

CONCEPT B-5
GREEN STYLE

1. To compress the machine environment of the aircraft.
2. To provide a relaxing, contemplative environment to relieve the迷影 and frustrations of the terminal operations.
3. To make the naturalness of the space and aircraft.