

CHAPTER IX. AIRFIELD CONCEPTS

1. PROPOSED RUNWAY IMPROVEMENTS

A. Third Parallel Runway

The facility requirements report (Chapter V, pp. V-1 to V-12) confirmed the conclusions of the current adopted master plan that a third parallel runway will be required and established that it will be needed in the 1993-98 time frame. The analysis identified 9,500 feet as an optimal length for that runway, but recognized that construction costs and environmental issues could affect the feasibility of construction to that length. It also indicated that a length of 7,800 feet would provide the needed additional capacity with the runway used primarily as a landing runway. It was determined that average aircraft delays would reach unacceptable levels and that air service would be restricted if the third runway is not constructed. The following analysis addresses the merits of full development or of the reduced length.

The west end of the runway should be located with the same westerly coordinates as Runway 8R-26L, being subject to similar highway structure clearance constraints as the existing runway. The new runway should be separated from Runway 8R-26L by 800 feet to permit construction of a full parallel taxiway between the two runways.

Alternative lengths of 7,800 feet and 9,500 feet are shown in Figure IX-1, and a summary of the operational benefits and construction costs is shown in Table IX.1. The costs of construction to 7,800 feet is \$27.6 million; construction to 9,500 feet would cost a minimum of \$77.6 million. It was concluded that the additional runway length provides some additional take-off capability but would yield only minor operational benefits. The additional costs are not justified by the operational benefits. Based on this data, it is proposed that the runway initially be constructed to 7,800 feet. The option to extend it to 9,500 feet should be retained in case this additional extension should become necessary.

The construction of the runway will require the following:

- the relocation or realignment of the Arizona Air National Guard facilities. Alternative strategies and locations of this realignment are addressed in Chapter XIII.
- acquisition and clearance of the properties in the southwest corner of the airport, including the Holiday Inn.
- relocation of the Airport Surveillance Radar.

Table IX.1

PHOENIX SKY HARBOR INTERNATIONAL AIRPORT

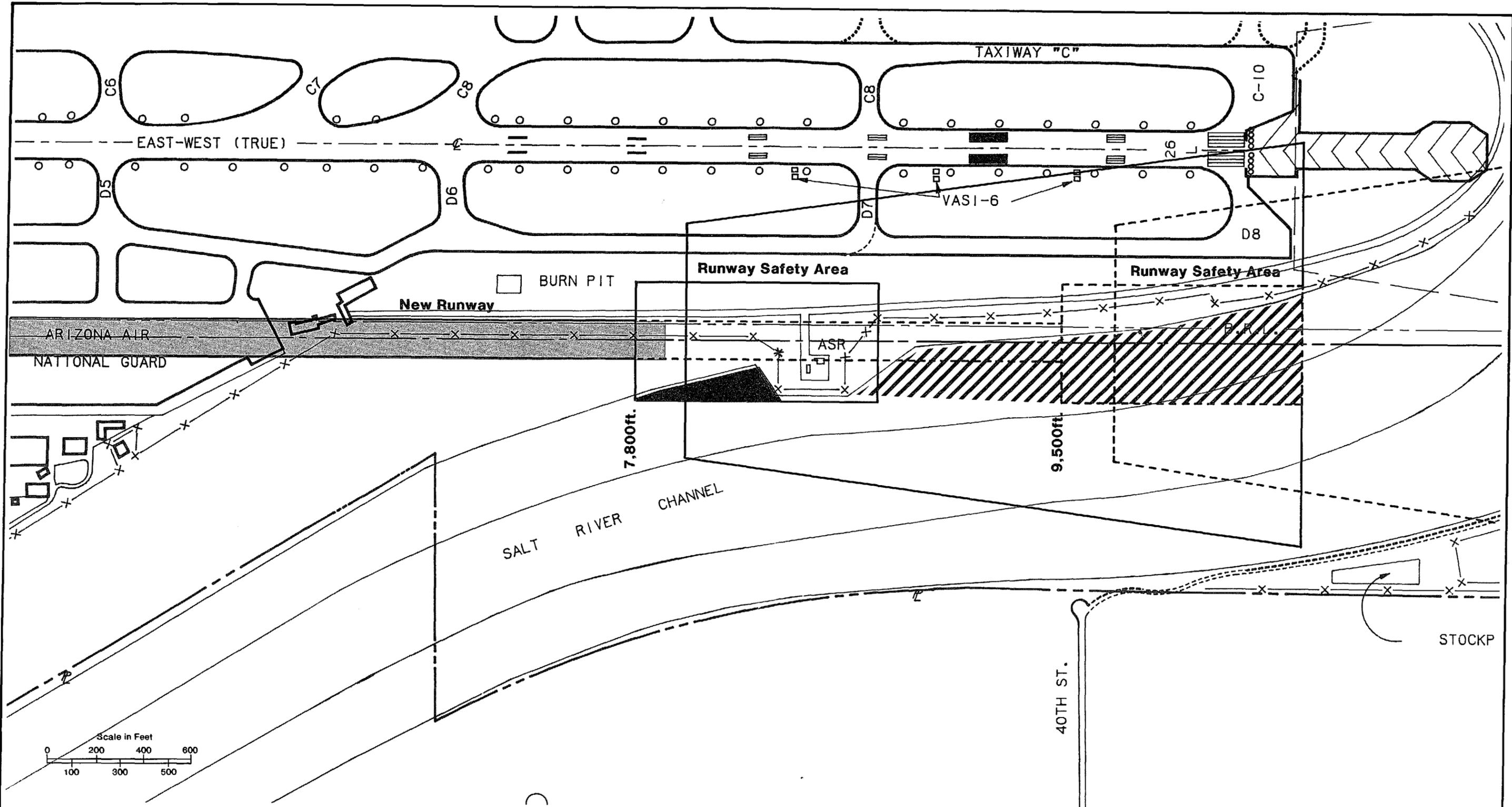
SUMMARY COMPARISON OF ALTERNATIVES FOR THIRD PARALLEL RUNWAY

Length	Operational Capabilities	Treatment of River Bank ¹	Cost of River Bank Treatment ²	Cost of Runway ³	Total Cost of Alternative
9500 feet	Primarily landing runway west. Adequate for 90% of current air carrier departures in hot summer months.	<u>Alternative 1</u> Structure on piers over Salt River to accommodate safety overrun area. (392,000 square feet.)	\$45.0 million	\$32.6 million	\$77.6 million
		<u>Alternative 2</u> Relocation of Salt River, fill on north bank, widening on south bank, including removal of landfill. Removal of 643,000 c. yds. 17,000 feet bank protection.	\$90.0 million	\$32.6 million	\$122.6 million
7800 feet	Primarily landing runway. Adequate for 75% of current air carrier departures in hot summer months. Adequate for take-offs by 737-300, 757, 767 aircraft.	Minor treatment of north bank of Salt River.	\$ 0.8 million	\$26.8 million	\$27.6 million

¹Alternatives for providing a platform for the construction of a safety overrun area to meet the FAA criteria.

²Should the safety overrun criteria be reduced in the future, these costs could change significantly.

³Order of magnitude costs, not including costs of realignment of Air National Guard facilities.

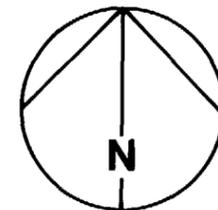


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-  Proposed 7,800ft. Runway
-  Ultimate 9,500ft. Runway
-  Runway Centerline & Extended Centerline

-  Extension of Bank for 7,800ft. Runway
-  Area To Be Filled or Bridged for 9,500ft. Runway



**Alternative Layouts
East End of Proposed
Third Parallel Runway**

Figure IX-1

B. Extension of Existing Runways

Analysis presented in Chapter V concluded that (for the average daily high temperature for the hottest month of the year):

- an 11,000-foot runway length is adequate for all of today's departures at full load, except for one daily B-727-200 departure to New York;
- Runway 8L-26R, length 11,000 feet, can accommodate 96 percent of the current departures at full load;
- Runway 8R-26L, length 10,300 feet, can accommodate 95 percent of departures at full load;
- B-747-400 and 767-200ER aircraft could depart direct to Europe and Tokyo from existing runways. The older generation of long-range aircraft, 747-200 and DC-10-30 would require 13,700 feet of runway at the "hottest month" temperatures, a length which is not readily attainable at PHX. Departures by these older aircraft on these very long routes would accordingly involve weight constraints at the hottest times of the year; and
- the newer generation of aircraft typically need less runway than the older aircraft, so any shortfall in runway capability will become progressively less important.

It is proposed that the option of extending Runway 8L-26R to the west by 1,000 feet be preserved on the ALP to provide an ultimate length of 12,000 feet. Given the relatively few current long-haul operations by older aircraft, the extension should be delayed until there is a clearly identified demand for the additional length. No other runway extensions are proposed. The extension is shown on Figure IX-2 together with other proposed airfield improvements. Extensions to the associated taxiways will be an integral part of this project. Relocation of 24th Street is a requisite for the runway extension.

2. PROPOSED TAXIWAY IMPROVEMENTS

A. Crossover Taxiways

It was established in the Facility Requirements chapter of this report that additional capability will be required for aircraft to taxi between the north and south sides of the airport.

Several alternatives were initially investigated for additional crossover taxiways of which two were evaluated in detail. One is an alignment directly west of crossover Taxiway X -- Taxiway Y, which would provide a two-way, north-south capability at the midfield. The second is an additional crossover in the

general vicinity of Terminal 1 -- Taxiway Z, which would provide good north-south flows on the west side of the airport. Other options were analyzed and discarded, principally due to inferior flow characteristics and difficulty in phasing construction.

During periods of both easterly and westerly operations, landing aircraft on 8L and 8R or on 26L and 26R bound for opposite sides of the airport must share the same one-way crossover taxiway, Taxiway X. The proposed crossover Taxiway Y adjacent to Taxiway X would remedy this situation.

Table IX.2 summarizes the effects on taxiway movements of the two alternative locations, for operations on Runways 8L and 8R (east flow) and Runways 26L and 26R (west flow). It addresses the needs of Terminal 4 users, Terminal 2 and Terminal 3 users, general aviation users, and all-cargo operators. The results of the analysis indicate that in the long-term, Taxiway Z will be marginally more beneficial than Taxiway Y. However, one of the primary benefits of Z is its value in providing access to the proposed third runway from the general aviation areas of the airport. This benefit will not be realized until the third runway is constructed in the 1995 time frame. It is, therefore, recommended that Taxiway Y be constructed first.

Given the airport's forecasted level of 2007 operations, all four crossover taxiways will be needed, requiring that both alternative taxiways be constructed.

FAA Air Traffic Control personnel concur with the above conclusions.

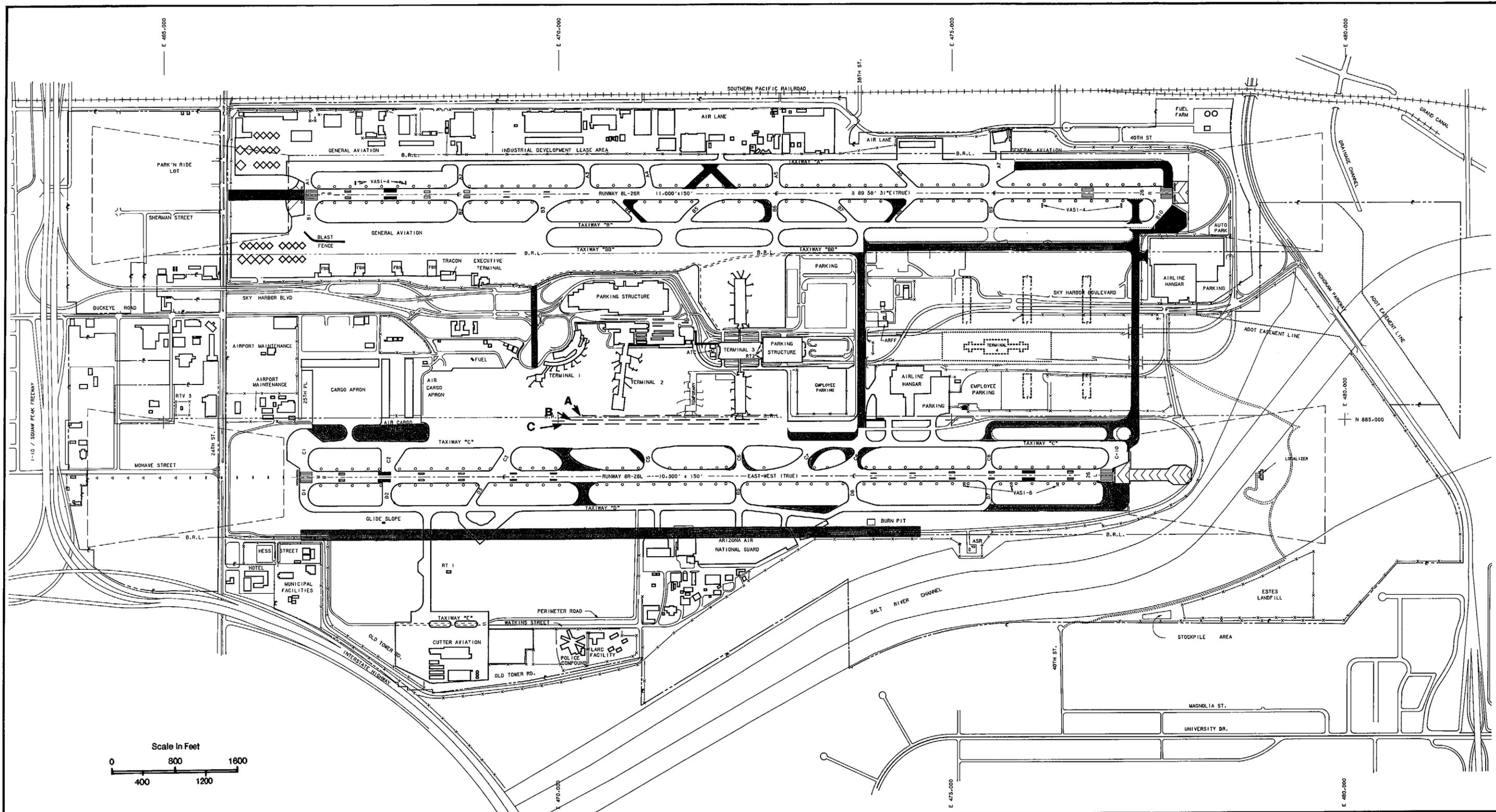
B. Other Taxiway Improvements

Exit taxiways planned or under construction are shown in Figure IX-2. They include:

- an angled exit to the south off Runway 8R-26L to reduce runway occupancy time for general aviation aircraft;
- five improvements to the exit taxiways off Runway 8L-26R; an angled capability to Taxiway B-6, enlargement of Taxiways B-4 and B-8 to permit their use for right-angled turnoffs for reverse direction landings; and two exits for general aviation aircraft on the north side of the runway, one each for 8L and 26R landings between Taxiways A-4 and A-5.

Enhanced dual taxiway capability will be provided for the north side of the airport when extension of Taxiway BB to the east end of Runway 8L-26R is completed.

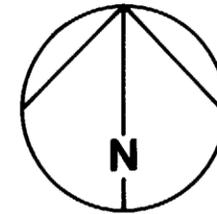
On the south side of the airport, Runway 8R-26L is also served by full-length parallel taxiways on both sides -- Taxiway C, 400 feet to the north and Taxiway D, 400 feet to the south. However, because of the limited distance between Taxiway C and Terminals 2 and 3, there is not adequate room for dual



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|-------|--------------------|---------|---------------------------|---|-----------------|
| ----- | Airport Boundary | ----- | Building Restriction Line | ■ | Future Pavement |
| ----- | Runway Safety Area | ----- | Railroad | | |
| ----- | Runway Clear Zones | -x-x-x- | Fenceline | | |
| ----- | Runway Centerline | ----- | Future Development | | |



Proposed Airfield Improvements

Figure IX-2

Table IX.2

COMPARISON OF ALTERNATIVE LOCATION FOR ADDITIONAL CROSSOVER TAXIWAY LOCATIONS

User	East Flow		West Flow	
	Crossover at Taxiway Y	Crossover at Taxiway Z	Crossover at Taxiway Y	Crossover at Taxiway Z
Terminal 4 Users	Good flows	Good flows	Good flows	South side landings would have to use new crossover, then back taxi; or use Taxiway W and back taxi. Flows for south side departures not ideal.
Terminal 2 & 3 Users	Significant back taxiing for opposite side departures.	Some back taxiing for south side gate departures using opposite side runway.	Good flows; minor back taxiing for southside landings going to north Terminal 3 gates.	Good flows; some back taxiing for opposite side landings.
General Aviation	Poor access to south side runways is a major problem.	Good access to south side key for new runway utilization. South side landings would have to use Taxiway X for access to north.	Landing aircraft on south side must back track to crossover.	Good flows for landings and takeoffs.
All-Cargo Users	Nighttime traffic levels should allow two-way use of all crossovers; west crossover near Terminal 1 better.			

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parallel taxiways for either Group IV or Group V aircraft. Currently, dual parallels are provided for Group III aircraft (B-727-200 and smaller) between Taxiway C-3 and C-6. Three alternatives were examined, each with different operational benefits and terminal impacts.

In order to obtain the capability for a DC-10-30/40 (the largest aircraft in Group IV) to pass a second DC-10-30/40 on an inside taxilane between Taxiways C-3 and X, an aircraft parking limit line would have to be established 343 feet from the centerline of Taxiway C (Line A on Figure IX-2). This would result in the loss of a minimum of two gates on the end of the South Concourse on Terminal 3. In addition, one to two gates on Terminal 2 (after USAir improvements) would be lost, if the taxiway improvements are implemented prior to removal of Terminal 2.

A second option would be to provide for a DC-10-30/40 on Taxiway C passing a B-757 on Taxilane CC, which would result in a parking limit line 294 feet from the centerline of Taxiway C (Line B on Figure IX-2). This situation would result in the loss of one to two gate positions on Terminal 3, depending on how the gates are reconfigured. There would be no effect on Terminal 2 gates.

A final option would be to provide capability for a B-757 on Taxiway C to pass a second B-757 on Taxilane CC, requiring a parking limit line 264 feet from Taxiway C. This option (Line C on Figure IX-2) would result in a limitation on aircraft sizes parked off the ends of Terminal 3 but should not result in the loss of any gates.

By the year 2007, there will be 250 daily operations by aircraft larger than the B-757. Smooth flow of traffic will require that the taxiway be adequate for passing DC-10-30/40s. It is proposed that this capability be provided by the year 2000 with the implications for loss of gates on the end of the south concourse of Terminal 3. At some point in time prior to 2000, Taxilane CC should be designated as a taxiway with the capability for a DC-10-30/40 to pass a B-757. The need for this improvement should be monitored and implemented accordingly.

Holding aprons are available at Runway Ends 8R and 26L and an apron is under construction at the end of Runway 26R. An apron is proposed for Runway 8L with the capability to handle three B-727-200 size aircraft. This will require the removal of four to eight T-hangars, each consisting of four bays. These additional proposed improvements are shown in Figure IX-2.

3. PROPOSED NAVIGATIONAL AND LANDING AIDS

A. Navigational Aids

The VTOR can be satisfactorily located on the roof of T-3 or between Runway 8R-26L and the proposed new runway.

The Airport Surveillance Radar (ASR) located adjacent to the Rio Salado will be displaced in the 1995-97 time frame by construction of the proposed third runway. Siting investigations by the FAA should commence with adequate leadtime to relocate this facility.

B. Landing Aids

There are current proposals to supplement the existing ILS on Runway 8R with ILS or MLS systems on Runways 8L and 26R. Recommendations are:

- Install an MLS or ILS on Runway 26R as scheduled. There are some practical difficulties to this installation in that the MALSR lighting structures would have to be located between the highway improvements planned for the west end of the airport and in the Indian Burial Ground. This will require agency approval and coordination. But installation on Runway 26L or the east end of the new runway would be more difficult, due to the Salt River channel. The Runway 26R location will provide one precision approach from the east. The REIL currently located on Runway 26L could be moved.
- Install an ILS or MLS on Runway 8L as scheduled.
- Remove the ILS currently located on Runway 8R, and install the system or a replacement MLS on the west end of the proposed third parallel runway. This runway will be the "outboard" runway on the south side of the airport and will be assigned for landings from the west in traffic situations which require use of all three runways. This installation would occur in the 1992-97 time frame.