

# RIO SALADO • MASTER PLAN

Carr, Lynch Associates

January 1985

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# Rio Salado Master Plan

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Prepared for  
**The Rio Salado Development District**  
By  
**Carr, Lynch Associates**  
In Association with  
**Economics Research Associates**  
**Water Resources Associates**  
**Sverdrup & Parcel and Associates**  
**Sherry Wagner**  
**Warren Jones**

January 1985



141 EAST PALM LANE, #202  
PHOENIX, ARIZONA 85004

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# Preface

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The preliminary draft of the Rio Salado Master Plan was completed in October 1983. It was then presented for review by public bodies, interested groups and organizations, and private individuals. This final draft incorporates into the plan the additions and revisions that resulted from that process.

Each of the three cities within the Master Plan area formed a citizen's advisory group to review the plan and make recommendations to the city council. The Tempe Rio Salado Advisory Commission, the Phoenix Ad Hoc Advisory Committee, and the Mesa Rio Salado Advisory Board all conducted an intensive review of the plan. Their recommendations were officially transmitted to the Rio Salado Development District by the respective city councils. The required changes have been made to the plan and it is now ready to be submitted to the councils for their formal approval. Changes were also made as a result of sugges-

tions from officials of Maricopa County.

In addition to the reviews of local governments, numerous other comments were received and incorporated into the plan. A formal public hearing was held by the Rio Salado District. Community Meetings and workshops were held. Neighborhood organizations were formed. The Rio Salado Technical Advisory Council commented upon the technical aspects of the plan. Private organizations and individuals submitted suggestions. All of this information has affected the revisions to the Master Plan.

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# OVERVIEW

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# Overview

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## INTRODUCTION

The Rio Salado Development District runs for 40 miles along the dry riverbed, from which it derives its name, through the heart of metropolitan Phoenix. It passes through several political jurisdictions: the cities of Phoenix, Mesa, and Tempe, Maricopa County, and the Salt-River, Pima-Maricopa and Gila River Indian Communities.

The District was created as an official planning and development area by the State Legislature to bring to life and productive use what is now, with the exception of productive sand and gravel mining, a dry, empty scar. The District Board of Directors has been charged with developing a Master Plan for the reclamation of this area.

Occasionally, a city has been able to convert a waste land into a fine recreational landscape. One thinks of San Francisco's Golden Gate Park, New York's Central Park, or Scottsdale's Indian Bend

Wash. To have that opportunity on such a scale that the conversion will actually reverse the development of the entire city, as well as convert the waste land itself, is an extremely rare event. The Phoenix area has this opportunity on a gigantic scale. The conversion of this broad expanse into a park and water landscape can literally turn the metropolis inside out.

This astonishing redirection of the Rio Salado will draw vigorous new development to its edges. It can also show how the careful use and re-use of water in an arid land sustains and enriches life.

The change will not come easily. It will require a long, intricate ballet of coordinated public and private moves: engineering works, landscaping, planning, development, land acquisition, water management, financing, institutional and legislative changes, and sharp shifts in public attitude. But what a magnificent spectacle that ballet can produce!

FIGURE 1 Existing Riverbed



This Master Plan document is presented as a guiding vision for the development of the Rio Salado. It serves as a policy guide for an extended sequence of actions. It lays out a strategy of action: where and how to begin, what forces to

assemble to set the whole in motion, and how to move from phase to phase. The results at each stage of development will be sufficiently attractive to motivate the continuing effort. And yet the plan keeps the future open by ex-

plaining which actions to take and which to avoid, in order to prevent the loss of desirable future options.

This work is purposefully general and makes proposals for only that portion of the District which is likely to develop within 25 years. As implementation proceeds, additional, more detailed plans and studies will be required before various elements can be realized.

## HIGHLIGHTS

This Master Plan involves a major reclamation of nearly 10,000 acres of land, including transformation of the present riverbed into a continuous regional park, and intensive development of its banks for industry, housing, recreation, tourism, and cultural and education uses. Reclamation depends on the construction of additional upstream flood control which would reduce the predicted 100-year

flood to no more than 55,000 cubic feet per second (cfs.). This control will be provided by the Central Arizona Water Control Study (CAWCS) Plan 6, the financing of which is now under study. Cost for this work has not been included since that information is not yet available. However, the cost for this additional flood protection will be substantial, and this expenditure will be necessary if the Rio Salado Plan is to be fully implemented.

This plan provides that the riverbed be transformed into a chain of narrow lakes, connected with drops and brief rapids, all set in a grassy bed, and enriched with lush low water planting along the waterways. The riverbed will become a continuous regional park, and support many diverse recreational activities, including swimming, fishing, camping, horseback riding, cycling, picnicking, small boat sailing on the larger lakes, golf and organized sports. It will also feature

clusters of planted islands and a canoeway. The banks on either side will be intensely developed, within two flanking parkways. Figure 2 is an overview of these features.

Various special elements of this plan are described in detail below. They include:

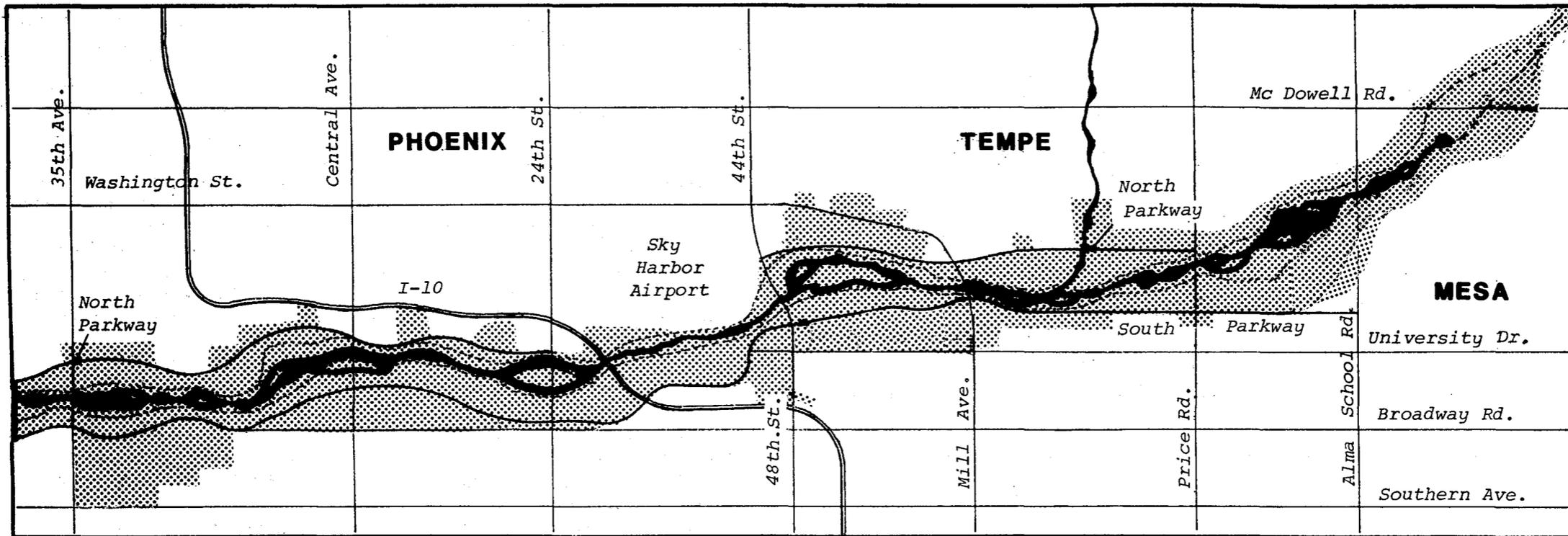
- a special mix of industry, housing and recreation;
- a continuing education and conference center near ASU;
- a "water garden" associated with special new museums;
- a new Southwest Cultural Center;
- a possible national or international Exposition;
- a desert arboretum;
- future new urban settlement extending to the west;
- lakes for boating and

swimming;

- campgrounds;
- "white water" rapids;
- equestrian trails;
- archaeological and historic sites;
- and many other associated features.

Table 1 summarizes the development proposals within this plan.

FIGURE 2 Master Plan Overview



 Area to be Developed

**TABLE 1 Rio Salado 25 Year Development Summary**

Riverbed Development:	(Acres-rounded)	
Water surface	1,400	
Grass & islands	2,085	
Sediment basin	<u>600</u>	
		4,085
Riverbank Development:		
Water	125	
Parks and recreation	860	
Parkways	470	
Private devel. in parkways	2,280	
Private devel. outside parkways	<u>2,050</u>	
		<u>5,785</u>
Total		9,870

This plan proposes that development begin at two points--Central Avenue in Phoenix and Mill Avenue in Tempe--and proceed from those points to link up the river as a whole. Very briefly, the key findings, proposals and implications of the plan are:

1. There is sufficient water to accomplish reclamation, without drawing on potable supplies. Development would begin by using groundwater that is salty or polluted, which will draw the water table down from possible contact with old landfills. Later, development will shift to using sewage effluent, after additional treatment, as this source grows in the future. This shift will prevent lowering of the water table below desired levels.
2. The design of a grassed floodway will manage water flows up to 55,000 cfs. In the early years, prior

to additional flood protection upstream, planted levees will protect the areas designated for first phase development.

3. Vast new resources for recreation, culture, and education are proposed. The plan also includes many water features. A new and intriguing landscape will open up to the public. New educational facilities, especially the proposed alternative secondary school, will not only make the area attractive to the new population, but significantly improve the educational opportunities for the area's present residents.
4. Substantial amounts of acreage for new mixed use private development are provided. Approximately 2,300 acres will be made available for private development between the parkways, and much of this land is proposed for acquisition by the Rio

Salado District or the State Land Trust, in order to control development more effectively and to realize some of the value added by the large public investment. But new development will also accrue beyond the parkway line. The total estimated new private development generated throughout the entire Development District, over the 25-year period, is 4,330 acres.

5. The principal economic impacts will be the new jobs and dwellings created in the district, the increase in land values, and the taxable land rescued from the existing floodplain. Primarily, the new dwelling units and jobs are redirected from sprawling growth at the metropolitan edge, affording a saving in public infrastructure which has not, however, been calculated.

The growth in permanent jobs is estimated at

74,000. The supply of new housing units would be increased by 16,000. Land values between the parkways and the river may be expected to rise eight to tenfold in twenty years above present values, excluding the effects of inflation. The annual amount of new property tax revenues, due to the rescue of land from the existing floodplain alone is \$37 million in year 25 of development.

6. About 300 existing dwelling units would be physically displaced over 20 years. This may appear a low number. It is predicted, however, on a substantial effort to strengthen and revitalize existing neighborhoods nearby. If such preventative measures are not carried out, the rise in land values will bring about a major loss of present housing, and a large displacement and disorganization of existing communities.

7. The plan greatly improves east-west and north-south traffic flow in the vicinity of the river. Major generators are located to take advantage of present or planned freeways and expressways and no serious conflicts are expected. Except for the cost of relocating power transmission lines now in the riverbed, the public facilities that must be constructed--roads, bridges, and utilities represent only a redistribution (and probably a saving) of public works from the metropolitan fringe to the center.
8. The reclamation plan does not disturb any known archaeological or historic sites. Rather, it enhances certain key sites of this kind. The location of new uses also takes account of aircraft noises generated by the present airport, as well as the additional noise of

a new third runway which may be built within twenty years. Unfortunately, It cannot reduce the impact of this increased noise burden.

9. Total development and operating costs of the project have been calculated. Numerous potential sources of financing were evaluated. They are listed and described in the plan. Two basic funding approaches are presented. The two methods use somewhat different assumptions and, together, provide the basis for the recommended financing strategy.

Under Funding Approach No. 1, the uninflated total of one-time development costs is estimated to be \$654 million over the twenty-five year period. Estimated annual operating and maintenance costs reach

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\$25 million in year 25. These figures include all public costs associated with the project, even those that would not be the direct responsibility of the District. Major funding methods for this approach are tax increment financing and the sale and lease of land.

Funding Approach No. 2 introduces the elements of inflation and financing costs into the plan. It also evaluates different methods of providing the funding. A direct property tax levy is used in place of tax increment financing. Either approach provides revenues that will more than cover public expenditures over the 25 year development period.

The recommended financing strategy calls for the use of a county-wide property tax levy, the sale of general obliga-

tion bonds, the immediate purchase of the needed land, and the eventual sale and lease of part of this land for private development. The strategy suggests that the device of tax increment financing be further evaluated and used later if determined to be necessary and feasible. Details of the financing approach are included in the Financing Section of the plan.

10. There are key issues of implementation, primarily those of financing, of land acquisition, of the control of private development, and of operation and maintenance. A strong district development entity is recommended, able to acquire, finance, lease or sell, operate, maintain, and control the development along the entire Rio Salado within the parkways. Other than

the original step of acquiring public ownership of the land between the parkways, development would take place in the normal mode of a public framework supporting and guiding private development. Development lands within the parkways, after being acquired by the Rio Salado Development District or the State Land Trust, would then either be resold to developers or leased to them on long terms.

11. A number of legislative changes will be required to implement the Rio Salado Plan. The major actions are the granting of authority to the District to levy a county-wide property tax and to issue general obligation bonds. Other legislation may be needed at a later time depending upon further analysis. These possibilities include tax increment financing and

changes to the state trust land statutes. The legislative needs are described in detail in the implementation section of the plan.

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# PLAN ELEMENTS

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# Physical Image

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This plan assumes that the additional upstream flood control will be in place within ten years, and that subsequent development will have to deal with a flood of no more than 55,000 cfs. The plan shows the eventual conversion of the floodway into a long succession of narrow, interlacing lakes, for the most part one-quarter to one mile long, linked by a continuous boating waterway. Drop structures would occur about every two miles, as shown on the plan, but in two locations, below 7th Avenue and between Mesa and the Mill Avenue Bridge, the slope of the river allows a longer length of quiet water. At each drop, the waterway would pass through rapids, which could be attractive features for those who enjoy white water boating.

Lakes and waterways pass alongside or among clusters of small planted islands, in a grassy bed, and within planted banks which are gentle or steep depending on the width

of the waterway. In a new and more dramatic form, these lakes and islands recall the old braided stream. Trees border the lakes and desert plants create a new landscape in the streambed. The Rio Salado flows again, using a minimum of water and affording multiple new recreational opportunities. Most of the 17 miles of riverbed (4,085 acres) is devoted to recreation: swimming, boating, fishing, picnicking, camping, hiking, riding and field sports. A shallow, grassed low-flow channel protects lakes or sensitive plantings where necessary. It can take urban run-off and up to 15,000 cfs of water, the normal five-year flood.

Paralleling the riverbed are two curving parkways-- generally within 1,000 to 2,500 feet of the streambed on the south side and rather closer on the north--within which the District or other public agencies will have acquired most of the land, and where the new river-

side development gradually unfolds. The southern parkway is continuous, from 35th Avenue to Alma School Road, while the northern road is interrupted by the airport. The southern bank is less affected by noise, has more generous space available, and can more easily be connected to a residential hinterland.

Above Country Club Drive, within the Indian community, the Rio Salado is shaped into a broad sedimentation basin in which flow velocities are sufficiently reduced that the water will drop its load of silt, sand, and gravel, and so will not damage the lakes and plantings located downstream. This basin will be an extended landscape, clothed in native desert plants, in places mined for the retained sand and gravel, but for the most part a wildlife refuge, open to camping and horseback riding.

Below the wide drop structure of this retention basin, the streambed can be planted with grass. The first large lake occurs at Alma School Road.

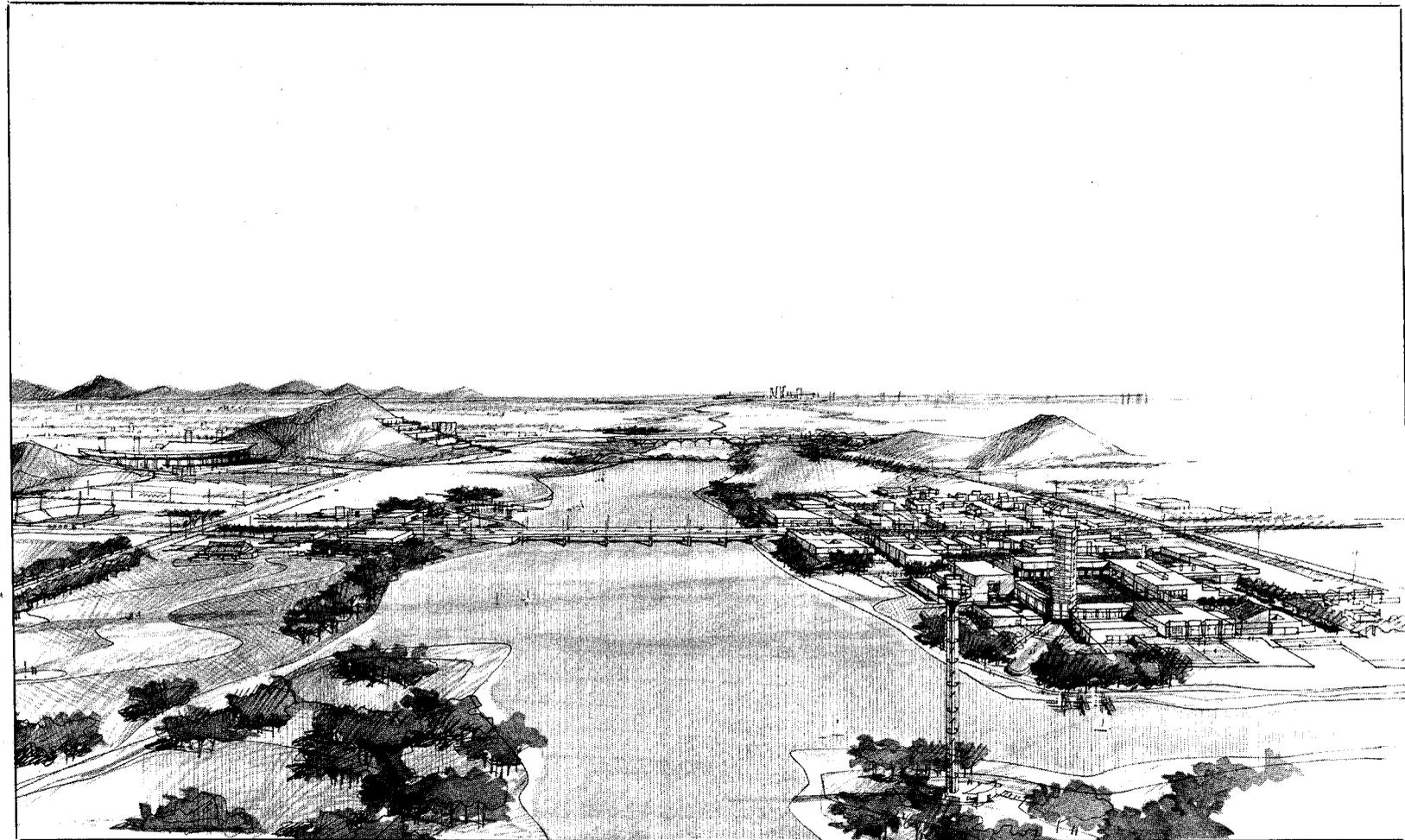
It lies wholly within the Indian Community, and is open to recreational use on a fee basis. Effluent from the expanded Dobson Road sewage plant in Mesa feeds that first lake, after undergoing tertiary treatment. South of this lake and its borders within the city of Mesa is low density residence, a resort hotel, a new Mesa public golf course, and industrial development along the Price/Pima Freeway. North of it, the land is given over to sand and gravel mining and industry, in accord with present Indian plans. The area within the City of Mesa between Country Club Drive and Granite Reef Dam will be the subject of additional planning immediately following the approval of a permanent financing vehicle for the District.

At McClintock Drive, we arrive at the historic, picturesque location where the Buttes and the Indian Bend Wash join the Rio Salado, across from Arizona State University. On the south, ASU will build its new golf course.

At the junction with Indian Bend Wash, the largest lake in the Rio Salado system provides a sheet of water a mile and a half long. It will be used for swimming, fishing, and boating. The Wash itself is completed with a stream and small lakes to its junction with the Rio Salado. This junction would be marked by a monument or observation tower set on an artificial elevation. Large rock formations cross the streambed along the course of the reef of bedrock, just below the surface. By its history and its geology, this is a unique location along the river. Development of this site will depend upon the satisfactory completion of a detailed investigation of its hydrological conditions.

Just south of Papago Park and the old Indian Bend Canal, recreational facilities and restaurants may locate along the north bank of the Rio Salado. To the east, between Scottsdale Rd. and Indian Bend Wash, on what is now an unincorporated county island,

FIGURE 3 Conference Center in Tempe



there would be a hotel with conference facilities that could serve activities related to ASU. Such a development might also include recreational features. This facility would allow the University to house visiting scholars and guests and provide room for those attending alumni events, symposiums, special courses, and conferences. Nearby offices could rent meeting rooms for their own special conferences and briefings. North of this complex, additional new townhouse developments are anticipated.

On the east bank of the Indian Bend Wash, a special mix of industry, recreation and housing would develop. It would have connections to Arizona State University, to the entertainment and resort functions along Hayden Road and further north in Scottsdale, and to the high technology industry developing around the airport.

Development at Mill Avenue in Tempe should take advantage of the elevation of the Tempe

Butte. The site should be evaluated for its value to the community for its research, education, and tourist potential. Pilot Project No. 4 of the Tempe Rio Salado Plan should be evaluated for inclusion here. A downtown commercial revitalization area will include at least one major new hotel at this point. The old Tempe Bridge may be renovated to carry pedestrians to the center to look out over the lakes or to reach the north side.

Below the bridges at Mill Avenue, the river opens into a broad expanse, filled with a dense cluster of islands and interlacing lakes. Here we are under the noisy approach zone of the airport, and so this stretch will be devoted to a park and a golf course within the islands. North of this, between Mill Avenue and the airport in Phoenix, the area along Washington Street will be dominated by a mix of industry, offices and commercial ventures. This is an area already under development, and subject to high air-

plane noise.

Once past the Mill Avenue bridges, a continuous band of new development on the south bank begins, between the parkway and the river, which will extend to 35th Avenue and beyond. Along Priest Drive, development is devoted to industry, an equestrian center, and a clubhouse for the golf course which lies in the streambed below.

Moving westward along this southern line, the industrial and office uses begin to be mixed with housing, once I-10 is crossed and the airport noise diminishes. Described in more detail in the section on New Development, this is a blend of residence, work place, and recreation. This mix extends to the new Rio Salado Industrial Recreational Park and proposed park golf course at 12th Street, and through it, connects to the special uses at Central Avenue.

At 24th Street, the river broadens to form a large new

island, occupied by offices, high density housing and one or more hotels. This will be a prestige location and principal event along the course of the river. The development is centered on a public pedestrian spine which can be expected to include retail and recreational uses. At both ends of the island are public parks.

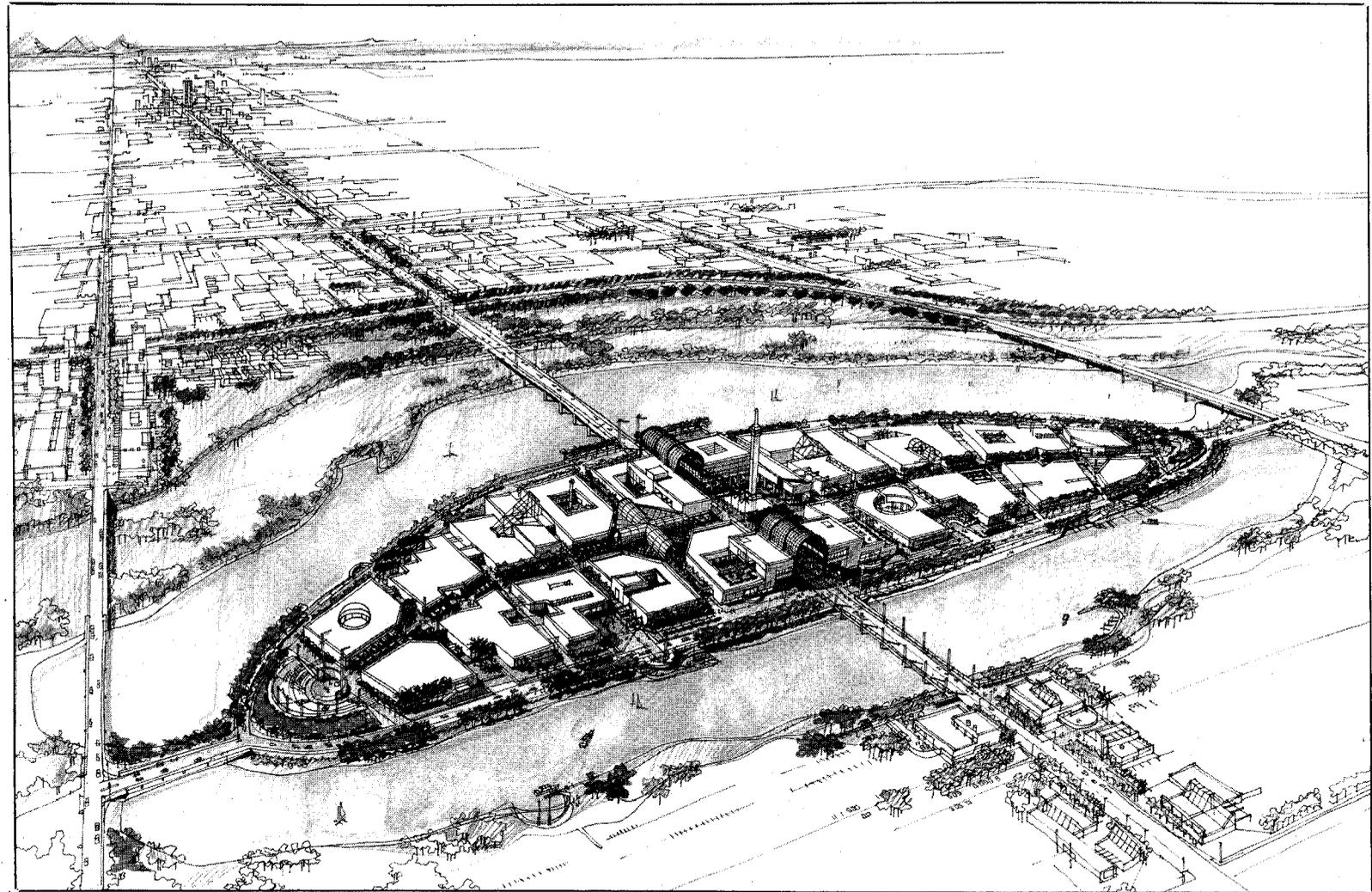
At 7th Street and Central Avenue, we approach the existing new industrial development on the north, and the river is confined between steep banks. But it still sports lakes and a waterway on a grassy bottom, all part of the continuous regional park. On the north bank, an effort will be made to strengthen and preserve the existing neighborhood between 12th and 16th Streets.

At Central Avenue, one of the key features of the plan occurs on the south bank of the Rio in the form of an island which stretches from 7th Street to 7th Avenue.

Coming from downtown Phoenix, crossing the bridge over the new lake in the riverbed, the magisterial entrance to the island is marked by high jet fountains. Shaded promenades and lookout points along the north edge of the island will provide a view of downtown and uptown Phoenix. Another, more narrow lake along the southern edge of the island creates a southern approach to this special place. Boats will shuttle between stations, connecting the southern island promenade to parking and attractions on the South Phoenix shore.

All along the central pedestrian spine of the island a series of "water events" are connected by waterways running under lath-roofed arcades. On one end, this pedestrian axis will lead to an open amphitheater for public festivities and concerts. The other tip of the island will be occupied by a discovery museum for children. A special water-garden at the junction with Central Avenue will provide freshness and shade.

FIGURE 4 Central Avenue Exposition Site





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Like the "Ile de la Cite" in Paris and the "Isola Tiberina" in Rome, this island will bridge the gap between north and south Phoenix. It will attract a variety of public institutions, special industries, entertainment, shopping and recreation.

The new regional institutions here should include a Southwest Cultural Center, dedicated to the research, conservation, interpretation and communication of the southwestern heritage. There could also be a museum and research study on the world-wide role of water: its physics and chemistry, its connection with living things, and its practical use and key importance throughout the world. Here might also be located Discovery Place, a museum for young people and their elders in which they could learn about the sciences and the arts by participation. There could be computer shops, bookstores and an ethnic market of food and crafts.

This central island location will also feature an alternative school--a special technical high school open to students throughout the city, but with a particular focus on students from the Rio Salado District and from areas of high unemployment. Such a school will encourage families to settle in the district, and will stimulate investment here by technical industries interested in a recreational setting and an educational link. These industries would benefit from participation in developing a skilled work force, would be linked to advanced research and might themselves be designed to explain their functions to the public. Restaurants and other entertainments would keep this true "industrial park" open in the cool of the evening. All this will be directly connected to downtown Phoenix by means of a shuttle bus system. During Phase I, a special exposition will work as a launching platform for an exceptional concentration of public features.

The opening of the exposition would be timed to coincide with the building of the upstream flood control dams.

Beyond 7th Avenue, the river opens up once more to a landscape of small hills along the north edge of the riverbed, containing a desert arboretum, displaying the life of the desert and the possibilities of desert flora. It would contain oases, dunes, mesas, and hidden "canyons", and might support a number of restaurants and other entertainment facilities. Adjacent to this, there is a lake in a park, and an equestrian center. Certain choice sections fronting on the park are given to new housing. A golf course has been built on the old landfill west of 27th Avenue. South of the arboretum, the parkway runs for a stretch along the present Broadway, then swings wide to give space to several major new resorts along the braided stream and its lakes. These resorts,

along with new low density housing, replace the auto junk yards now located there. This plan does not fix the disposition of the District beyond 35th Avenue, but recommends that this ground should be preserved for a major future development. One of the strategic aims of the entire plan, implemented by the initial occupation at Central Avenue and followed by the progressive westward extension via the desert arboretum and the parkway, is to open up this empty western territory, now abandoned by the northward and eastward drive of Phoenix. New settlement might extend along this completely unexploited growth axis of the metropolis. It could be carried out according to a careful general plan, and make maximum use of the recycled water released by existing urban settlement. District strategy should be designed to unlock and to control that

great opportunity. Preparation of a plan for this area will become a priority immediately following the realization of a permanent financing vehicle for the District.

The following Tables 2 and 3 outline the anticipated public and private development activities during the initial 25 year period.

**TABLE 2      25 Year Development: Summary by Jurisdiction**  
(acres-rounded)

	<u>Phoenix</u>	<u>Tempe</u>	<u>Mesa</u>	<u>Salt River Indian Community</u>	<u>Total</u>
Private Development	2,895	830	400	205	4,330
Riverbed	1,695	810	270	1,310	4,085
Riverbanks (public recreation)	655	195	100	35	985
Parkways	250	125	80	15	470
Totals	5,495	1,960 <sup>1</sup>	850	1,565	9,870

<sup>1</sup>This total includes 75 acres of unincorporated islands that are within the Tempe boundaries and thus now under the jurisdiction of Maricopa County.

**TABLE 3 25 Year Development: Summary by Use**  
(acres-rounded)

	<u>Phoenix</u>	<u>Tempe</u>	<u>Mesa</u>	<u>Salt River Indian Community</u>	<u>Total</u>
<u>Riverbed:</u>					
Water	725	390	90	200	1,395
Grass	975	420	180	510	2,085
Sed. Basin	0	0	0	600	600
<u>Riverbanks</u>					
Water	110	15	0	0	125
Parks	425	145	0	35	605
Golf	120	35	100	0	255
Parkways	250	125	80	15	470
Private Development	2,895	830	400	205	4,330
Totals	5,495	1,960	850	1,565	9,870

## PHASING

The physical development of the Rio Salado will unfold gradually over the initial 25 years. During the first 10 years (Phase I), growth is limited while funding for the upstream dams is secured and construction begun. Yet, significant development is possible and is extremely important even during this early period. The plan begins therefore at two points.

The first is at Central Avenue in Phoenix, on the south side of the river. Central Avenue is the symbolic axis of the metropolis, and a successful development at this point will tie downtown to the Rio Salado, and also leap the chasm between north and south Phoenix. Moreover, it will set the stage, not only for remaking the river eastwards toward Tempe, but also for opening up the axis for growth to the west. Its potential benefits justify a significant concen-

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tration of public and private investment. The plan suggests a unique mix of uses that might occur there, and how that apparently formless environment could be transformed, and so transform the popular image of the river. The special exposition is recommended as a launching platform. The exposition would build the southern lake and another lake initially vulnerable to a major flood on the streambed to the north, to create the new island. Furthermore, it would lay down the infrastructure for this key development, including the special waterways. Parking for the exposition will be across the southern lake, and visitors will be ferried over to the exposition grounds.

The second point for early action is at Papago Park and Indian Bend Wash in Tempe, primarily on the northern side and east of Mill Avenue. The buttes and the Wash make this the most picturesque section of the river, and it is the one most closely connected to

Indian history and to the history of White settlement. It is also a significant geological break-point. The presence of A.S.U., the favorable market location, and the active plans of the city of Tempe, all reinforce the special quality of this place.

Early action would include the completion of Indian Bend Wash, and a boatway (also initially vulnerable to flooding) along the north edge of the riverbed. The conference center, new housing, a new hotel, and new commercial revitalization along Mill Avenue could be expected to appear here.

At both points, then, the potential of the river will have to be demonstrated. Only then will developers be encouraged to develop and occupy these locations. While some temporary riverbed features might be exposed to a major flood, all activities on the banks would be fully protected from flooding, as planted levees will be constructed from the start.

Between these points, other scattered development will occur before the up-stream dams are built. For the most part, this will consist of industry locating near the airport. Mixed use development, including new offices for the Salt River Project, will occur in the vicinity of the present Legend City. This development is likely to require a minimal amount of special public action.

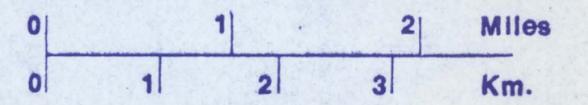
These Phase I developments will be designed to be successful even if additional up-stream flood control is not realized. Additionally, these early improvements use only a minimal water supply. Thus, they are not dependent upon a final resolution of the water issue. The Phase II developments will be designed to be compatible with both Phase I and the then-known realities of flood control and water supply. As the details of Phase II are determined, adjustments can be made to reflect any changes in circumstances without jeopardizing the viability of Phase I.

# LEGEND

- |  |                         |  |        |                                  |
|--|-------------------------|--|--------|----------------------------------|
|  | Planning area limit     |  | C.     | Commercial                       |
|  | Jurisdictional boundary |  | Cr.    | Commercial recreation            |
|  | Airport Noise zone      |  | H.     | Hotel                            |
|  | 100 year flood plain    |  | Off.   | Office                           |
|  | Bridge                  |  | Ind.   | Industry                         |
|  | Park                    |  | Lor.   | Industry, office and residential |
|  | Riverbed                |  | Rehab. | Rehabilitation                   |
|  | Water                   |  | EXPO   | Exposition                       |
|  | Island                  |  | Pkg.   | Parking                          |
|  |                         |  | Hdz.   | High density residential         |



FIGURE 6 Phase I Development



RIO SALADO DEVELOPMENT DISTRICT

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# Recreation and Open Space

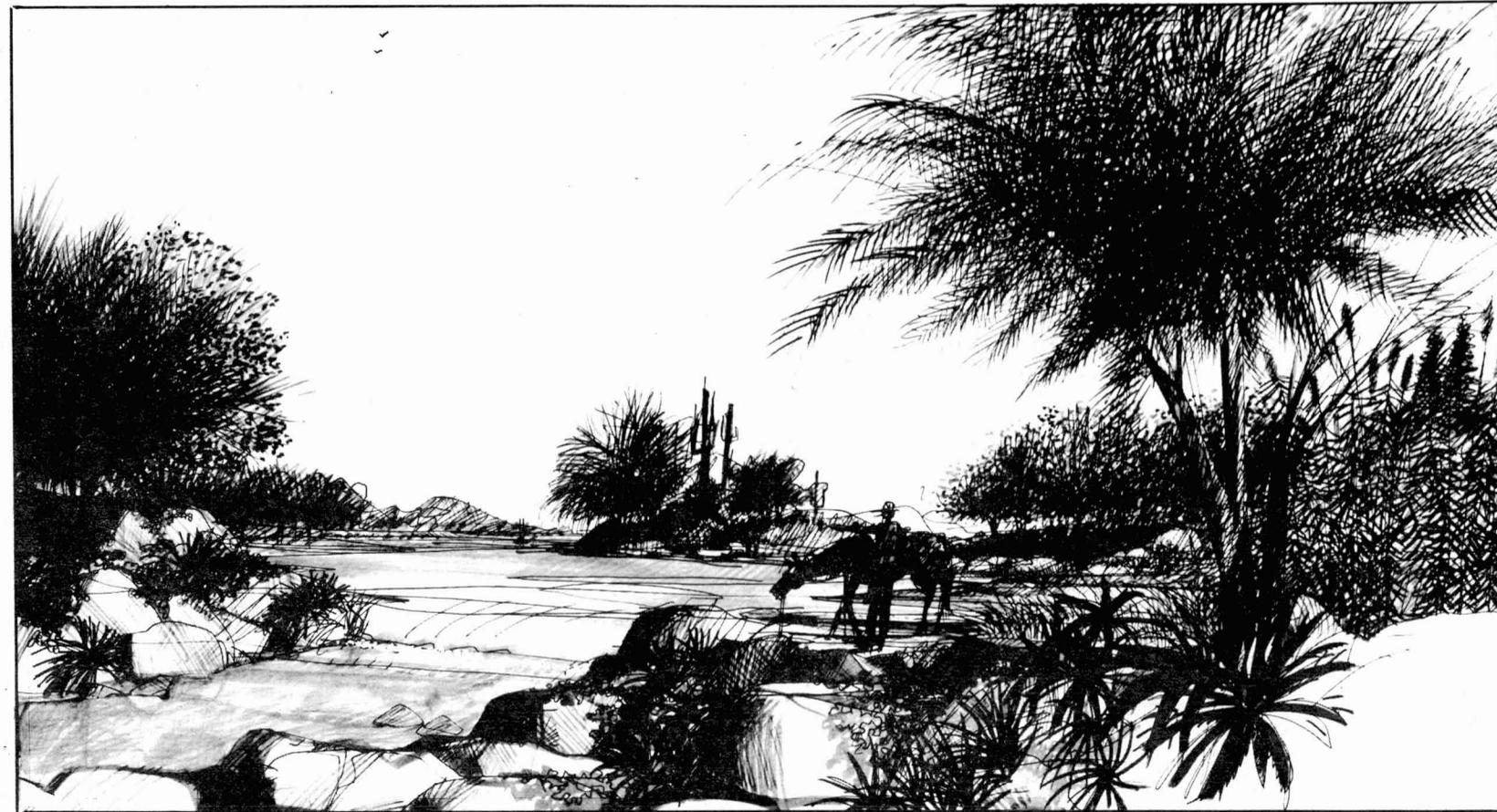
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## RECREATION

Development of the Rio Salado and its banks will create an immense new regional park. In the first 25 years of projected development, roughly 4,500 acres of parklands, water bodies, and public open space will be built as is illustrated in Fig. 9. Public access to all of these features will be maintained.

The Rio Salado will not only be five times larger than New York's Central Park, it will also be richer in its landscapes and activities. The Rio can provide 15 miles of lakes, ponds, beaches, streams, open fields, wooded groves, trails, formal playing fields, golf courses, equestrian centers, camping areas, resorts, restaurants and indoor sports facilities. Fishing, tubing, swimming, boating and other water related sports will be possible for the first time in the center of the metropolis. The park will also provide opportunities for bicycling, hiking, horseback riding,

FIGURE 7 Riverbed Park Character



nature observation, picknicking, roller skating, jogging, soccer, baseball and a wide variety of other outdoor activities. Densely planted islands in the outer reaches of the park will make particularly interesting camping sites, a new urban resource.

Some of these activities will also be available in small parks and greenways on the banks, interspersed with housing, industry and office development. There will be continuous shaded trails along the riverbank from which walkers, joggers and bicycle riders can look over the riverbed park and watch others boating and tubing on the rapids or horseback riding.

Citizens, young and old, from near and far can come to the Rio Salado and spend an entire day taking part in several of these free or low cost activities. The Rio Salado park system will contribute greatly to meeting the significant regional recreation needs recently cited by the Statewide Comprehensive Outdoor Recreation Plan

FIGURE 8 Riverbed Park at 7th Avenue



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and by various local needs assessments. Details of these assessments are in the Appendix. It will also serve as a meeting ground for citizens from the various ethnic backgrounds of the metropolitan region. It will help to heal the division between North and South Phoenix. The park will be a new focus of regional pride and also a tourist attraction.

Along the length of the Rio Salado Park will be several major recreational features, each of which will lend its special character to the adjacent development. The southwestern end of Phoenix will come alive with resort hotels and high quality residential areas, which will take advantage of the lakes, a golf course, an equestrian center, and the nearby Desert Park Arboretum. Special restaurants and night spots will spring up here as well.

The new island on the riverbank at Central Avenue in Phoenix will be the site of a one-year international exposi-

tion focused around water and its uses. Later, this island will be a prestigious location for high technology research and development. Several new institutions with recreational appeal would be built as features of the exposition and remain as permanent activities in the future. These would include a Water Museum, a Southwest Cultural Center, and Discovery Place, a hands-on museum for young people (and their elders) about science and technology. The Southwest Cultural Center will be described in greater detail in the Social section.

Adjacent to the island, on the riverbank between 7th and 16th Streets, is a new park and golf course, a special recreational resource for the residents of South Phoenix. Traveling eastward, a site has been earmarked for a new State Fairground or a domed stadium. Both of these facilities have been cited as a regional need and either would contribute significantly to the recreational offerings of the Rio. The State Fair in particular

has an immediate need for larger facilities to expand its program on a year-round basis. A portion of the fairground might be used for a small theme park. Nearby, in one of the widest portions of the riverbed, there is a golf course, an equestrian center, many playfields, and a number of wooded islands for picnicking and nature observation.

Further upstream, in the vicinity of Arizona State University, lies the largest lake in the system at the confluence of Indian Bend Wash with the Rio. This is the steepest drop along the river, which provides a special opportunity for white water boating. There will be sailing and canoeing on the lake, and swimming and tubing in the rapids. ASU students can take advantage of this opportunity.

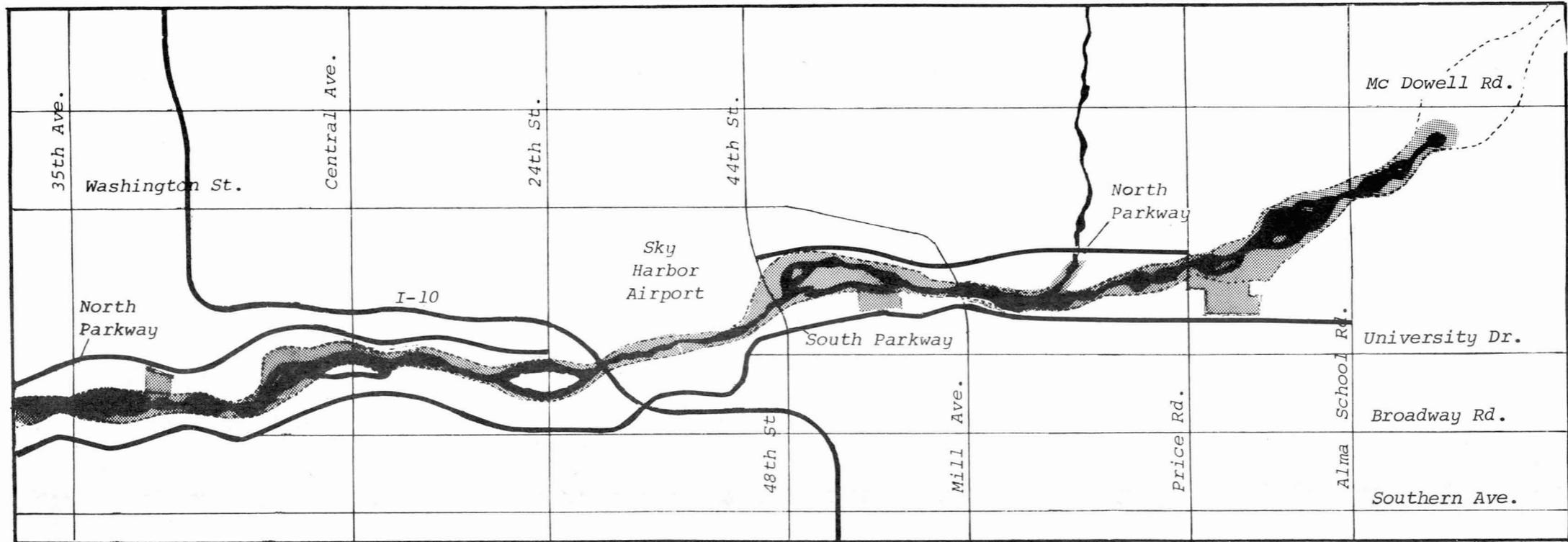
The area between this great lake and the sedimentation basin, which lies predominantly in the Indian Community, can also become a special place. Despite continued sand and gravel mining, the river-

bed can be developed as a wildlife preserve. A native landscape treatment will provide cover for birds, lizards and other desert fauna. Here too would be lakes developed particularly for fishing and operated as a concession by the Indian Community.

## LANDSCAPE PLANT CHARACTER

The public spaces of the Rio Salado will form as a richly variegated landscape, which emphasizes drought-tolerant native plants requiring little care and water. Plants requiring substantial irrigation, beloved by many of the mid-westerners and easterners who have migrated to Phoenix, will also have their place, but they should be used on a limited basis at focal points. A major point of the park should be to acquaint visitors with the variety and richness of desert plantlife. The suggested treatments for the major landscape zones which follow are also illustrated in a planting plan

FIGURE 9 Public Recreation Areas



 Areas Designated for Recreational Use

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and in its composite section (Figures 10 and 11).

#### The Urban Edge

Many open spaces on the riverbanks would be landscaped with plants now typically found in desert cities (Area A). These relatively lush plants will line the parkways, the riverbank edge and the small greenways lacing the urban edge, where shade is most needed. These areas would be above the flood zone and safe from water damage. Such planting requires a regular irrigation program.

#### Open Grasslands

This area of the riverbed (Area B) would be covered by a Bermuda grass mat to control flood erosion. The scattered trees would include *Olneya tesota* (Ironwood), *Prosopis* species (Mesquite), *Cercidium floridum* (Blue Palo Verde), and *Parkinsonia aculeate* (Mexican Palo Verde). This area would be inundated by any major flood. Additional irrigation would probably not be required for the trees, since the Bermuda

grass will have to have occasional supplemental water to maintain an adequate mat. The above tree species do not offer much obstruction to flood waters and, even if broken or uprooted, would not contribute any significant debris which might otherwise pile up on bridge abutments downstream. These plants normally naturalize in such areas, and will regenerate from the roots.

#### Recreation Water Courses

The banks of the water bodies (Area C) would be vegetated with an association of riparian trees and plants typified by *Arundo donax* (Giant Reed), *Populus fremonti* (Fremont Cottonwood), *Salix goodingii* (Goodings Willow), and *Washingtonia filifera* (Arizona native Fan Palm). This area would also be inundated by major floods. These plants require constant moisture, and would be planted immediately adjoining the water course. Should the water course be sealed, the

sealed edges could be re-filled with soil for these plants.

#### Low Flow Channel

Some of the same plant associations used above would be repeated along the low flow channel, but only those that would lay over during high water. These species would not create any notable obstruction to the water flow or contribute debris downstream. Species included might be *Arundo donax* (Giant Reed), *Tamarix parvifolia* (Spring Flowering Salt Cedar), and *Salix goodingii* (Goodings Willow). Goodings Willow will probably establish itself without being planted, if the water supply is constant enough. With the exception of the willow, these plants are also quite drought tolerant and would survive with no problem the periods when the riverbed is totally dry.

#### Armored Banks

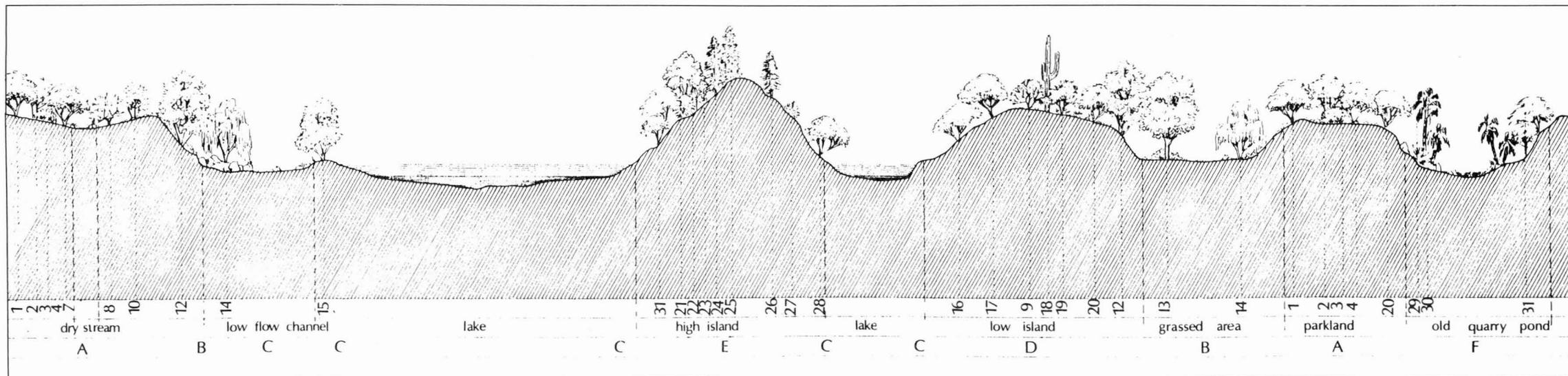
Wherever riprapped banks are needed for erosion protection,

they would be softened with the addition of a scattered planting of *Tamarix aphylla* (Athel Tree or Tamarisk). This species of tamarisk is evergreen, makes a larger tree than the others, and is very easy to establish by simply driving two inch caliper poles three feet into the ground. This could be done at the same time the bank is being riprapped. The Athel tree can tolerate an annual topping to prevent the development of too much flow-obstructing vegetative mass. Probably the topping would only need to be done every third year to prevent such a vegetative build-up, cutting back one-third of the trees each year, rotating to the next third the following year, and so on. The tree can be cut back to a basic stump just before the flood season, and the stump regrowth will rapidly green up the area the following growing season.

#### Intermediate Levels

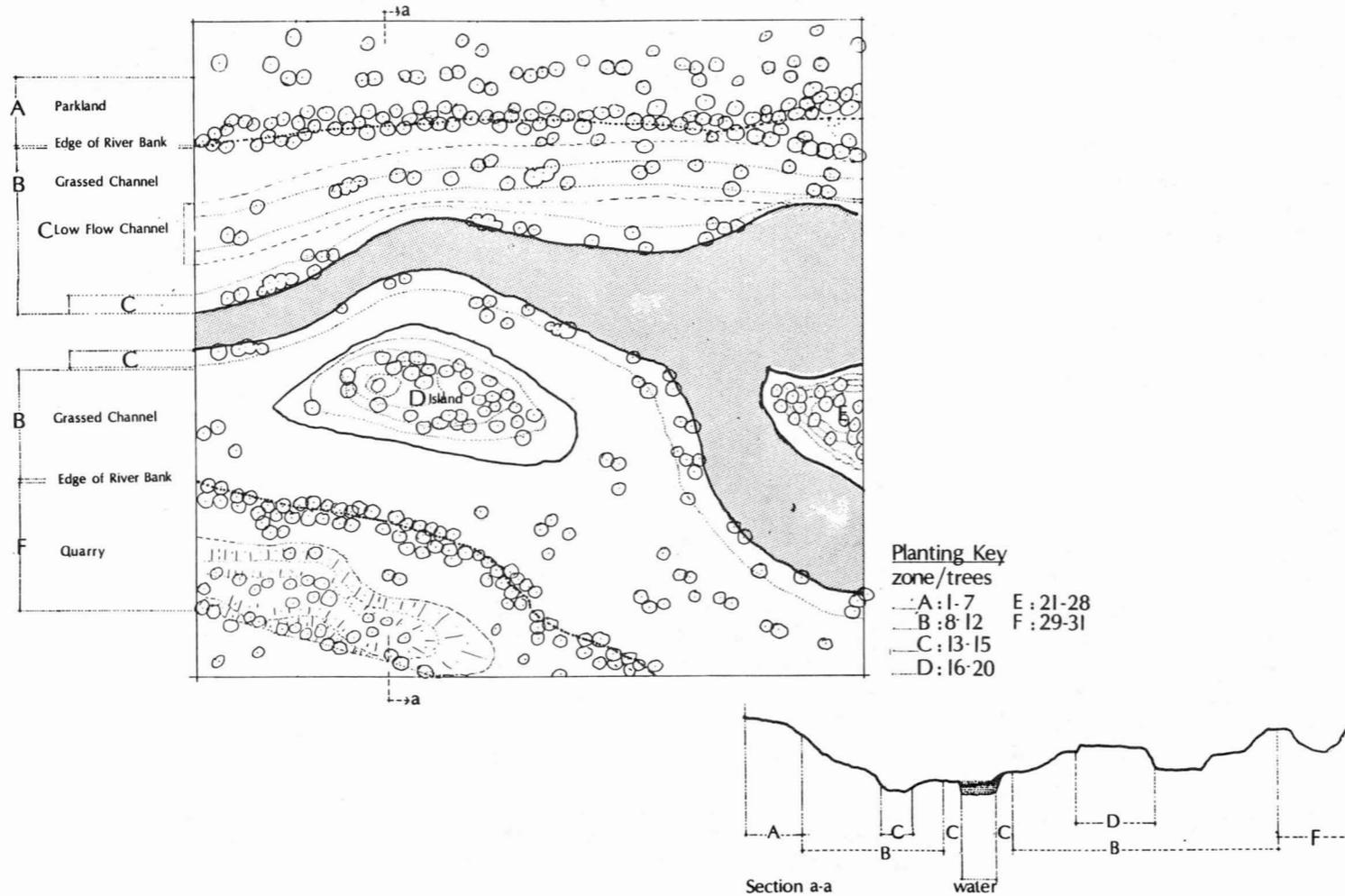
In those areas mostly above the major flood level (Area

FIGURE 10 Major Landscape Zones



- |  |  |   |  |
|--|--|---|--|
| 1. Broadleaf Evergreen                   | Little-Leaf Palo Verde                       | 16. Acacia: Evergreen                         | 24. Pinus: Pine                            |
| 2. Brachychiton: Bottle Tree             | 10. Olneya Tesota: Desert Ironwood           | 17. Prosopis Alba: White Poplar               | 25. Casuarina Stricta: Beefwood or She Oak |
| 3. Ceratonia: Carob                      | 11. Prosopis South American Hybrid: Mesquite | 18. Carnegiea Gigantea: Giant Cactus          | 26. Celtis Pallida: Desert Hackberry       |
| 4. Eucalyptus: Eucalyptus                | 12. Platanus Arizonica: Sycamore             | 19. Chilopsis Linearis: Desert Willow         | 27. Phoenix Dactylifera: Date Palm         |
| 5. Olea: Olive                           | 13. Populus Fremontii: Fremont Cottonwood    | 20. Prosopis Velutina: Velvet Mesquite        | 28. Tamarix Parviflora: Salt Cedar         |
| 6. Rhus Lancea: African Sumac            | 14. Salix Goodingii: Weeping Willow          | 21. Quercus Suber: Cork Oak                   | 29. Arundo Donax: Giant Reed               |
| 7. Schinus Molle: California Pepper Tree | 15. Tamarix Aphylla: Athel Salt Cedar        | 22. Parkinsonia Aculeata: Jerusalem Thorn     | 30. Washingtonia: California Fan Palm      |
| 8. Cercidium Floridum: Blue Palo Verde   |  | 23. Vauquelinia Californica: Arizona Rosewood | 31. Acacia: Evergreen                      |
| 9. Cercidium Microphyllum:               |  |   |  |

FIGURE 11 Planting Plan



D), plants would be representative of the Sonoran Desert Uplands. The predominant species would be *Cercidium microphyllum* (Littleleaf or Roothill Palo Verde), *Acacia minuta smallii* (Western Sweet Acacia), and *Prosopis velutina* (Velvet Mesquite). *Carnegiea gigantea* (Saguaro) and other cacti could also be used above the flood line, while the other plant species could be placed somewhat down the slope below the point of the major flood high line. This planting would need some supplemental irrigation, at least to become established above the area where the Bermuda Grass mat is to be maintained.

#### Island Tops

These areas (Area E) would include the largest island spaces above the major flood line, and therefore could be quite thickly forested. Plant association could be built around *Casuarina stricta* (Coast Beefwood or Australian Pine), and in some cases true Pine species such as *Pinus halepensis* (Aleppo Pine) or

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*Pinus pinea* (Italian Stone Pine). Species associated with this "key tree" might include *Brachychiton populneus* (Bottle Tree), *Prosopis chilensis* (Chilean Mesquite) and other South American species. Also, *Schinus molle* (California Pepper Tree) and other drought tolerant broad leafed evergreens, such as *Quercus suber* (Cork Oak) could be included. These upper level plant communities could grade down and blend with whatever combinations occupied the lower portion of the peak, whether a shore line plant community or open grassland.

#### Old Quarries and Borrow Pits

In several locations, old quarries and borrow pits should be retained for their special qualities. These old excavations often contain small lakes or ponds and present unique planting opportunities. The plant associations here would resemble those in Area C (the water edges), containing water edge or riparian plants, backed by more drought resistant species.

The old quarries would probably not suffer any stress during a major flood, as there would be no strong current through these areas. The water level, however, might fluctuate, inundating shoreline plants for periods of time. Therefore, water edge plants such as *Arundo donax* (Giant Reed), *Populus fremonti* (Fremont Cottonwood), *Salix goodingii* (Goodings Willow) and *Washingtonia filifera* (Native Arizona Fan Palm) should be used. Other species of palms such as *Washingtonia robusta* (Mexican Fan Palm, Phoenix species) could also be used here because the plant palette would be more isolated from the general river scene. The back-up plants on the slopes could be similar to those in Area D (the intermediate levels). These would probably require some supplemental irrigation to maintain a good appearance, while the riparian plants growing at the water's edge would not require additional water.

#### Desert Park Arboretum

The redevelopment of the Rio Salado presents a special opportunity to develop a site for a regional arboretum. This is particularly important at this time, with the general tightening up of water use, especially water to support landscape plantings. This arboretum can demonstrate water-miser plants as alternatives to the water demanding plants so commonly seen in the Phoenix area. The arboretum would lie above the major flood line, but could also be extended below that line wherever water side associations were displayed. These variations are illustrated in Figure 12.

Although the entire Rio would be a desert park, this arboretum would be a distillation of the plant communities associated with the various landscapes described above, in a smaller area and arranged for learning. In addition, many more delicate species not able to withstand floods could be displayed here. The landscape could include mini-

ature canyons, arroyos and dunes typical of the desert, together with seeping springs and small desert oases. This would become a major metropolitan attraction, as well as a center for learning about desert plants.

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Figure 12 Arboretum



# New Development

Even now, in the midst of unattractive uses and large areas scarred by periodic flooding, some new development is occurring or is planned. A large hotel is proposed for a parcel in downtown Tempe, across from City Hall. Several other projects are in the planning stages in the more desirable parts of the District.

After the construction of up-stream flood control and the park in the riverbed, we project that 10-15% of the metropolitan region's new development over the next 25 years can be attracted here. The basis of this projection is described in Appendix B. This will amount to more than 4,000 acres in a wide variety of uses.

The following three tables (4, 5, and 6) summarize what is shown on the overall plan.

**TABLE 4 New Private Development by Jurisdiction**

(acres rounded)

<u>Use</u>	<u>Phoenix</u>	<u>Tempe</u>	<u>Mesa</u>	<u>Salt River Indian Community</u>	<u>Total</u>
Industrial (I)	665	230	50	65	1,010
Mixed Industrial, Office & High Density Residential (IOR)	555	0	0	0	555
Mixed Industrial & Office (IO)	110	95	0	130	335
Office (O)	75	65	0	0	140
Commercial (C)	175	45	45	10	235
Hotels (H)	10	15	0	0	25
Resort Hotels (RH)	60	90	20	0	170
Commercial Recreation (CR)	45	50	0	0	95
High Density Residential (HDR)	230	240	0	0	470
Low Density Residential (LDR)	810	0	325	0	1,135
Private Golf	160	0	0	0	160
<b>Totals</b>	<b>2,895</b>	<b>830</b>	<b>400</b>	<b>205</b>	<b>4,330</b>

**TABLE 5 New Private Development: Phase I - Years 1-10**

(acres rounded)

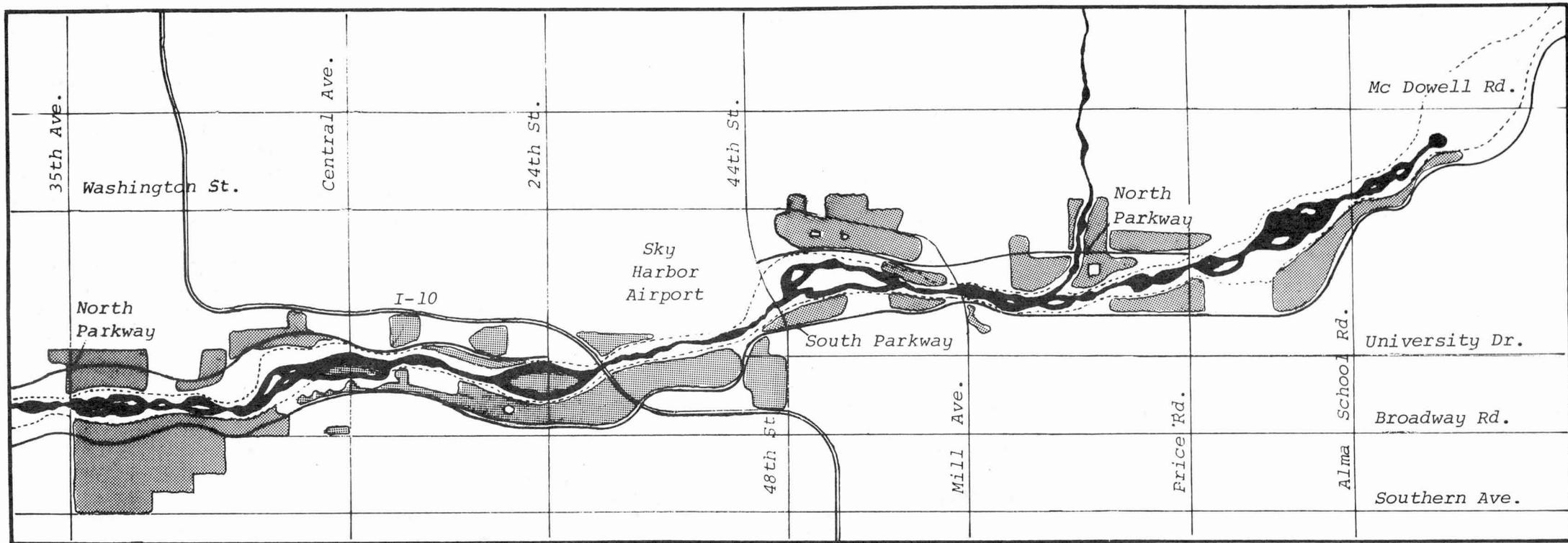
	<u>Phoenix</u>	<u>Tempe</u>	<u>Mesa</u>	<u>Salt River Indian Community</u>	<u>Total</u>
Industrial (I)	350	140	40	65	595
Mixed Industrial, Office & High Density Residential (IOR)	40	0	0	0	40
Mixed Industrial & Office (IO)	0	40	0	0	40
Office (O)	0	65	0	0	65
Commercial (C)	0	10	0	0	10
Hotels (H)	0	15	0	0	15
Resort Hotels (RH)	0	65	0	0	65
Commercial Recreation (CR)	0	45	0	0	45
High Density Residential (HDR)	20	100	0	0	120
Low Density Residential (LDR)	0	0	0	0	0
Private Golf	0	0	0	0	0
Totals	410	480	40	65	995

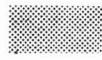
**TABLE 6 New Private Development: Phase II - Years 11-15**

(acres rounded)

	<u>Phoenix</u>	<u>Tempe</u>	<u>Mesa</u>	<u>Salt River Indian Community</u>	<u>Totals</u>
Industrial (I)	315	90	10	0	415
Mixed Industrial, Office & High Density Residential (IOR)	515	0	0	0	515
Mixed Industrial & Office (IO)	110	55	0	130	295
Office (O)	75	0	0	0	75
Commercial (C)	175	35	5	10	225
Hotels (H)	10	0	0	0	10
Resort Hotels (RH)	60	25	20	0	105
Commercial Recreation (CR)	45	5	0	0	50
High Density Residential (HDR)	210	140	0	0	350
Low Density Residential (LDR)	810	0	325	0	1,135
Private Golf	160	0	0	0	160
<b>Totals</b>	<b>2,485</b>	<b>350</b>	<b>360</b>	<b>140</b>	<b>3,335</b>

FIGURE 13 New Private Development



 Areas Designated for Private Development

## HOUSING

The Rio Salado Master Plan recommends substantial amounts of new housing. The new park will create sites along the river's edge that will be ideal for residential use. In many areas, this housing can be closely mixed with new clean industries and offices, so long as the vehicular access and circulation is kept separate. The table which follows indicates how many housing units are envisioned for construction and absorption during the two phases of development in each jurisdiction. The total number of new units over 25 years is expected to exceed 16,000.

For the most part, high density housing will be in the form of attached townhouses with about 15 units to the acre, similar to that now seen along Indian Bend Wash in Scottsdale. Some three-story garden apartment buildings may be scattered along the river's edge, and higher-rise elevator buildings might occur on the island complex at 24th Street, and at the

TABLE 7 New Housing Units

	Phoenix	Tempe	Mesa	Total
High Density <sup>1/</sup>	6,780	3,600	0	10,380
Low Density <sup>2/</sup>	4,050	0	1,625	5,675
Totals	10,830	3,600	1,625	16,055

Note:

<sup>1/</sup> 15 units per acre

<sup>2/</sup> 5 units per acre

Central Avenue site. Higher density housing will be encouraged for most of the development area from 19th Avenue in Phoenix to McClintock Drive in Tempe, as a more efficient use of prime land. It is likely to be a mixture of single-family ownership, condominiums, and rental. While the vast majority of the units will be market-rate housing, some units should be subsidized to accommodate relocated families and other lower income individuals, particularly those who currently reside in the immediate area.

Low density housing would be limited to five units or fewer per acre and would largely be market-rate single family ownership. Such housing is recommended in Mesa east of Price Road and in Phoenix west of 19th Avenue, where land values and densities are expected to remain at a lower level for some years to come. Significant amounts of housing are not to be expected until after the visual quality of the area is significantly improved, however.

FIGURE 14 Typical Townhouses

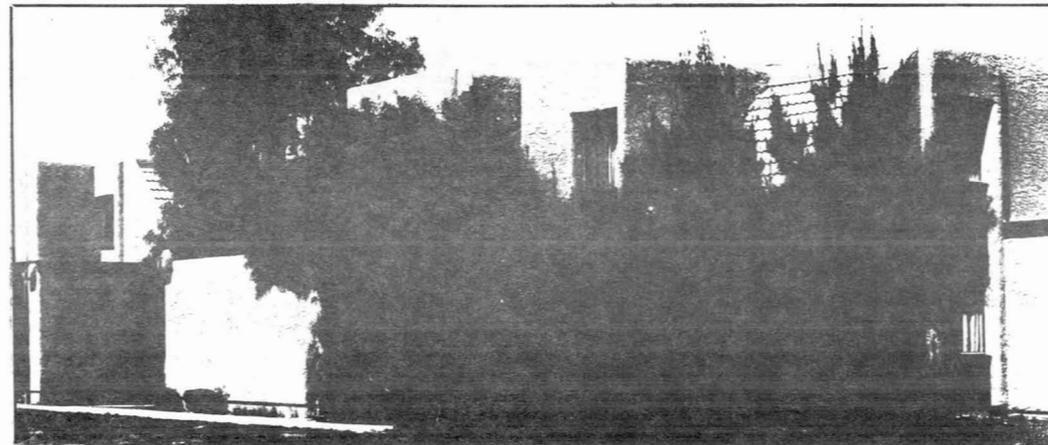
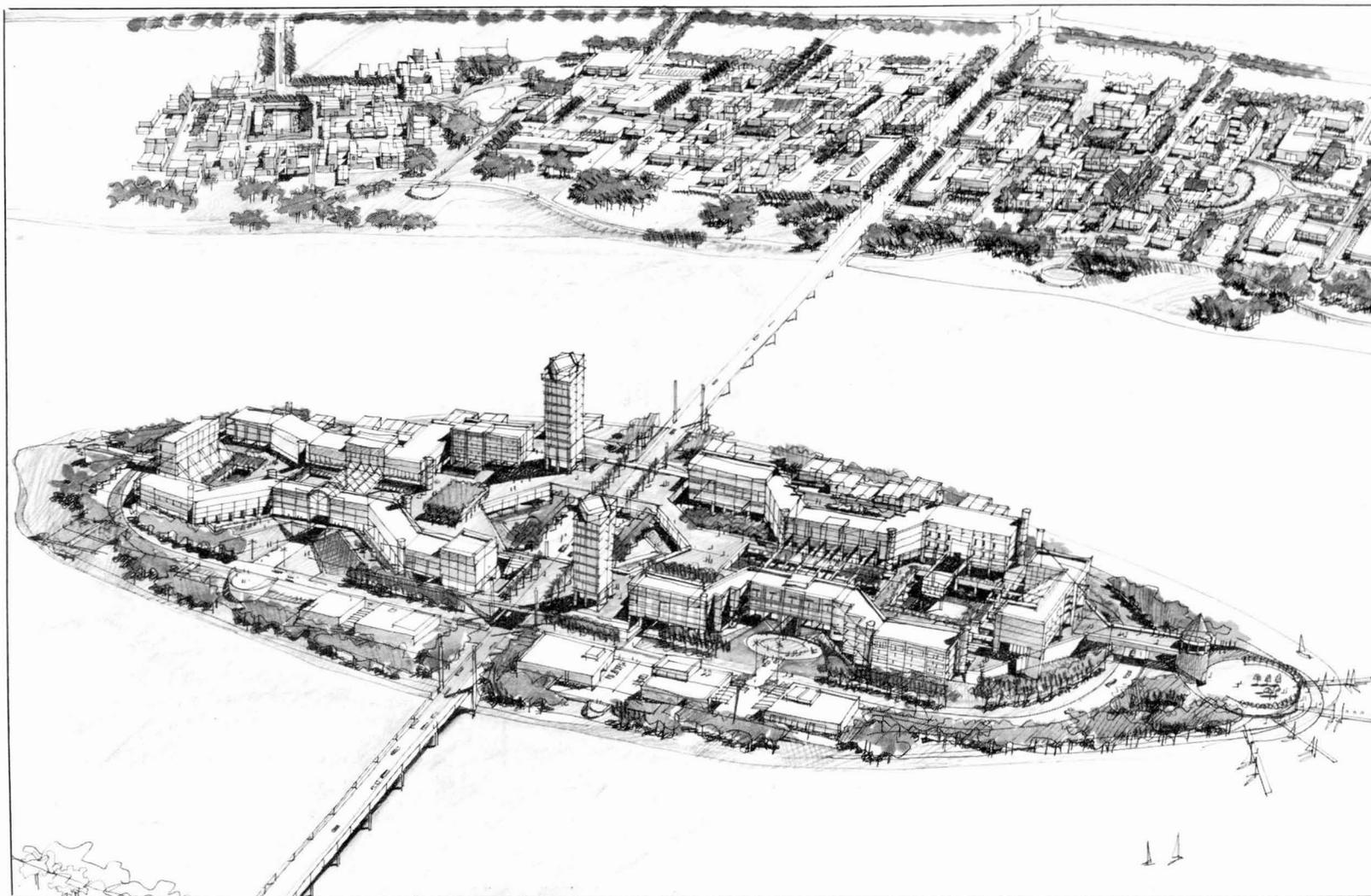


FIGURE 15 24th Street Island Complex



It should be noted that no new non-Indian housing has been proposed within the boundaries of the Salt River Pima-Maricopa Indian Community. This is in keeping with the current policies of this community. We do expect, however, that some new housing for Indians will be constructed within the planning area, away from the major roads or the industrial uses planned to locate near the river.

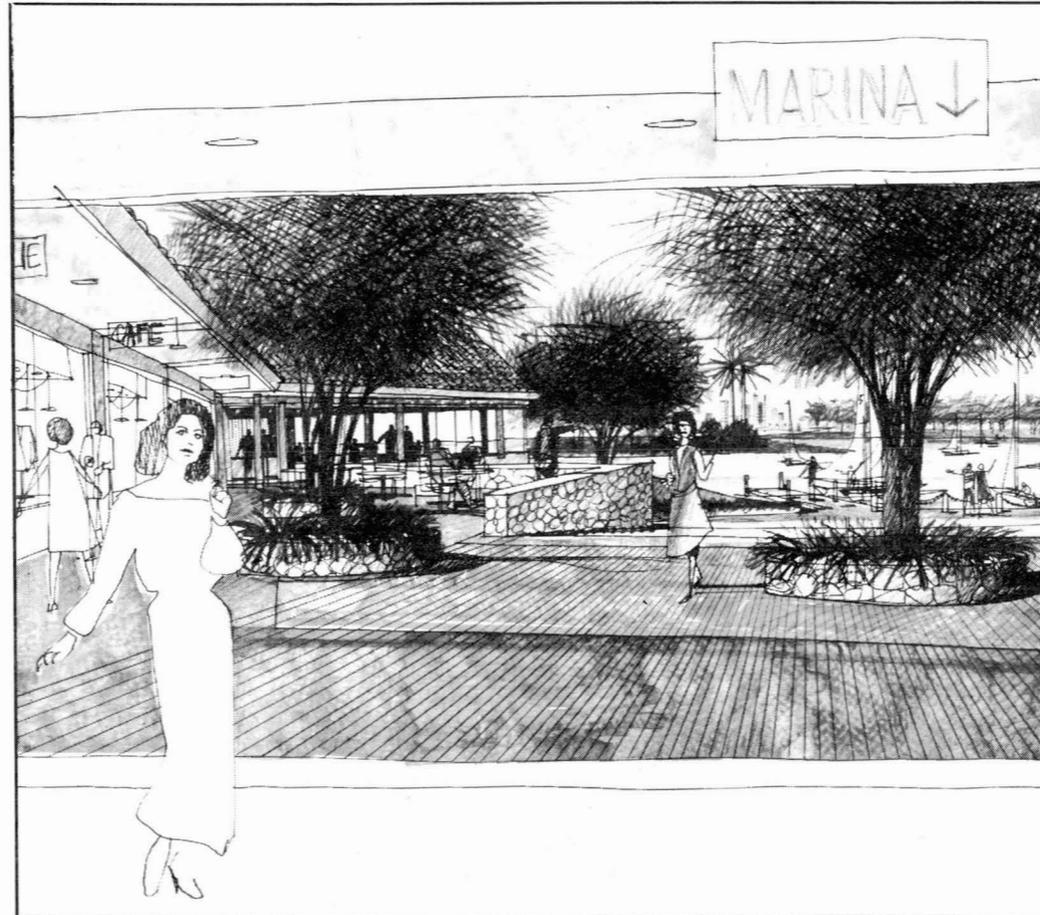
## COMMERCE

In general, commercial establishments such as retail shops and restaurants will come only after there are office employees and residents in place to support them. However, in Tempe and one or two favored sites in Phoenix, some of these uses will spring up earlier. Likely locations will be near to the intersection of major streets with the parkways.

Except for a few special cases, hotels and resorts will also not appear until the area has been made attractive with water

bodies and parks. They will seek locations that tie in with their projected clientele and that have good views. The proposed hotel in downtown Tempe, for example, has been sited for its proximity to Arizona State University, but it also takes advantage of the Tempe Butte. Others will locate to serve airport traffic. Some will wish to appeal to the Phoenix convention crowd, while one resort shown in Mesa would be an attractive site for individuals associated with Hughes Helicopter and other new industrial developments in North Mesa. We project a major resort with conference facilities on Scottsdale Road, taking advantage of the proximity to A.S.U. and the confluence of Indian Bend Wash with the Rio Salado. Several resort hotels and marinas, as illustrated in Fig. 16, will appear in the western sector, once the desert park and arboretum are in place.

FIGURE 16 Typical Marina



## INDUSTRY

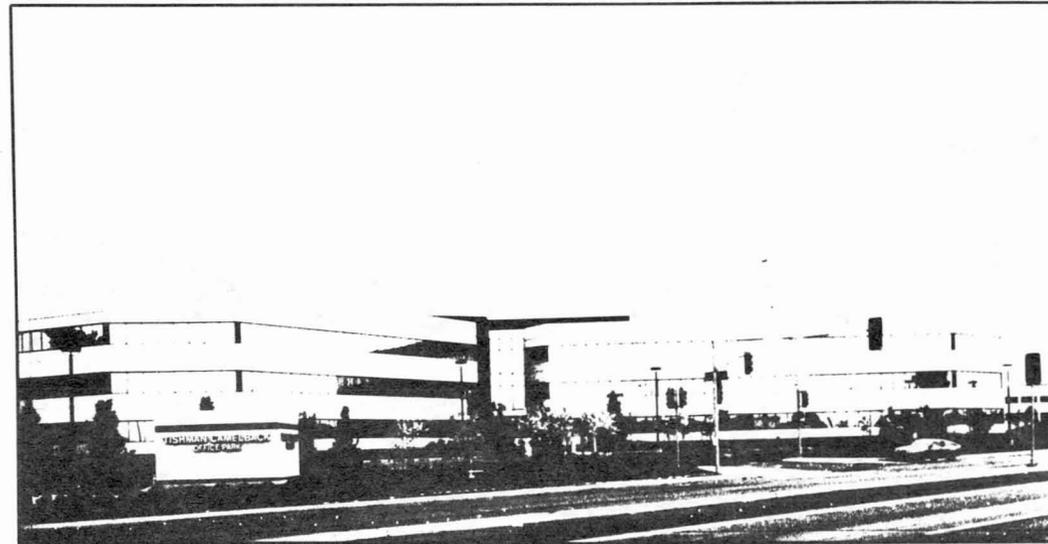
All types of industrial uses are not expected to come on line simultaneously. Industry and offices which are less sensitive to the quality of the existing environment, are likely to come first. Much industry and most warehousing are influenced more by location than by nearby amenities. Accessibility to the airport, the freeways and the expressways is more important than the presence of a lake. Other industrial uses create their own internal landscaped environment.

Once the parkways and the new park are in place, high technology industry mixed with research and development is likely. This industry would be different from the warehousing, trucking, and storage operations now so common to this area. The high tech firms will be more labor intensive and engaged in the research and development or manufacture of products for fields like electronics, communications, health, and computers. Such plants will

provide green spaces and recreational facilities on the site for their employees. The Rio Salado will be an attractive location for such firms. They seek areas that offer good housing and recreation, as well as educational facilities, both to train new employees and offer continuing education for existing employees. All of these features will be a part of the Rio Salado development. The plan also introduces a mixed-use concept not found in Phoenix today, a combined industrial, office, and residential zone. The proposed overall proportions of this mix would be approximately 50% industrial, 10% office and 40% residential. Much of the area around 24th Street in Phoenix might be occupied in this manner. Such a mixture is just beginning to appear in south Phoenix as clean industries locate in the midst of residential areas.

Unlike the present unplanned trend of development, where industry and housing may share the same access street, this

FIGURE 17 Typical Office Park



proposal is a planned integration of work and living. This will make possible a short daily journey to work on foot or by bicycle, a return home for lunch, more flexible supervision of children, more part-time employment, and more convenient housing for key employees or company guests. By planning for this mixture, conflicts that often occur in unplanned situations can be avoided. Open green spaces, rather than being merely the unused landscaping of "industrial parks," can be designed for use by workers and residents at different times of day. By using loops and cul de sacs, trucks and other business traffic can be routed so that there is little or no impact on the residential sites.

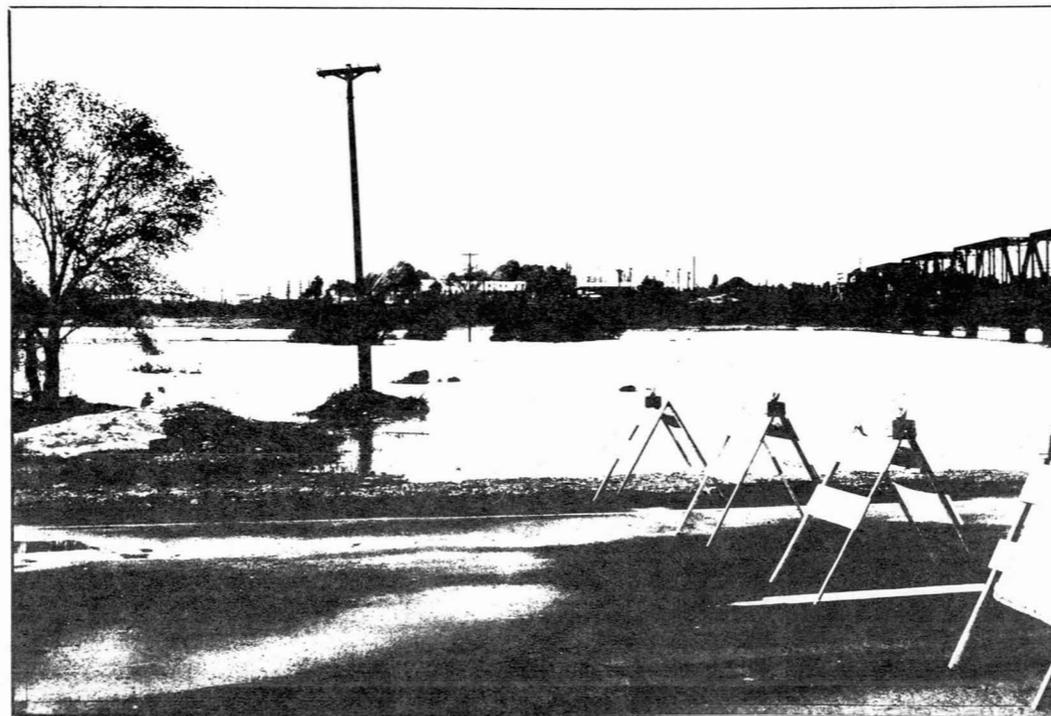
# Flood Management

The full implementation of this plan assumes additional upstream flood protection which would lower the 100 year flood from 200,000 cubic feet per second (cfs), to 55,000 cfs. With this reduction, substantial amounts of land within the present floodplain can be reclaimed for development and the riverbed itself can be made attractive and usable.

The traditional approach to flood management involves locating the drainageways, determining the rate and duration of the flood events, and designing a concrete or rock-lined channel to carry the predicted flows. In the Rio Salado, on the contrary, the floodway will be a water-based park, consisting of a system of lakes connected by streams, all in a shallow channel lined with Bermuda grass and developed for various recreational uses.

Although the grasslined, multi-purpose floodway is a relatively recent idea, several excellent prototypes

FIGURE 18 Flooding at Mill Avenue



exist. A nationally-renowned example is Indian Bend Wash in Scottsdale, Arizona.

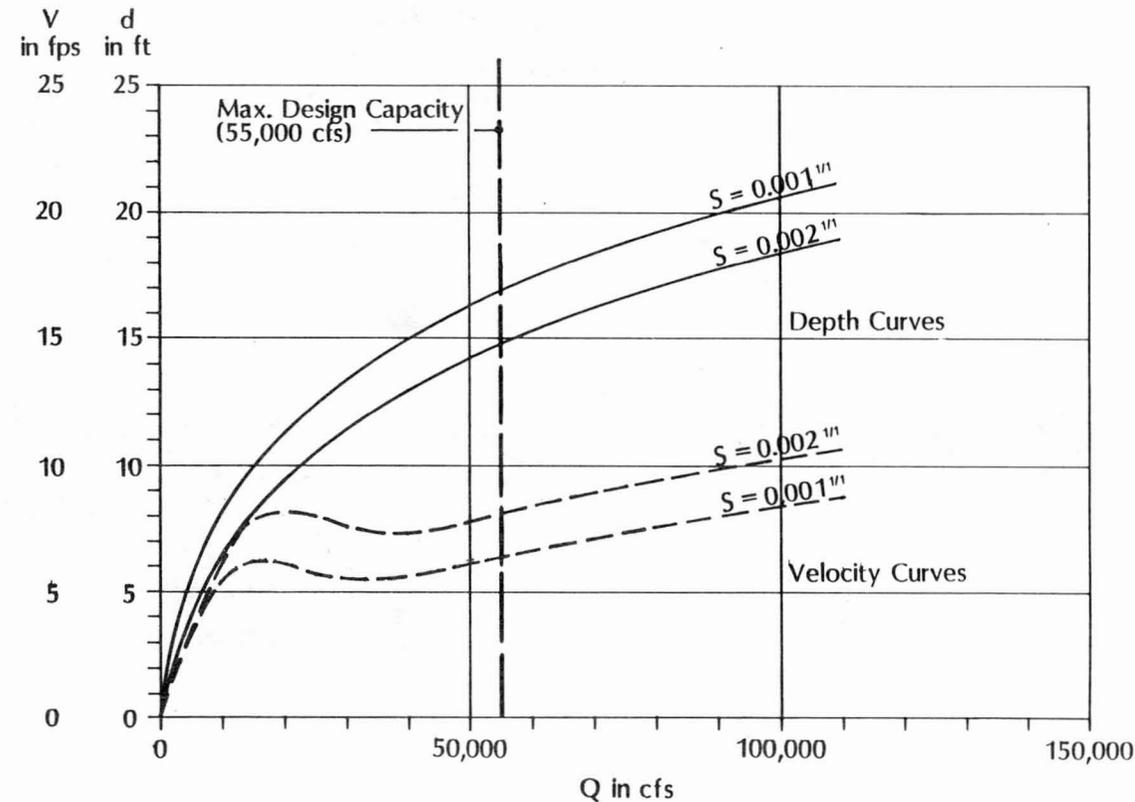
## PHYSICAL ELEMENTS

The floodway consists of a Bermuda grass lined channel, beginning approximately at Country Club Road in Mesa and extending approximately to 35th Avenue in Phoenix. To carry floods up to 55,000 cfs, the channel would have a minimum width of 1,100 feet, widening to 3,000 feet or more at approximately five locations. Side slopes would generally be no greater than five to one. In special locations, where there are width constraints, the side slope may be as steep as three to one. Where necessary to protect first phase development, there will be levees faced with stone and planted. Schematic diagrams showing a minimum width section, and its hydraulic characteristics are

shown in Figures 19 and 20, respectively. The criteria for the floodway are shown on Table 8.

To maintain the Bermuda grass and to allow for other plantings, the maximum velocity within the floodway should be 7-1/2 ft/second. The invert or bottom flowline of the river has an existing average slope of approximately 0.2% (0.002 ft/ft). In general, the acceptable slopes due to velocity are in the range of 0.1% to 0.2%. Some variance from these limits may be possible. Although slope is a major factor in determining velocities, other elements can influence the design, in some instances materially. The above slopes relate to the minimum width section of 1,100 feet. Thus, where existing slopes exceed 0.2% and the river is narrow, drop structures will be required to adjust the slope. In locations where the floodway section exceeds a width of 1,100 feet, the maximum slope may be increased, without allowing the velocity to exceed the 7-1/2

FIGURE 19 Hydraulic Characteristics of 1,100' Wide Floodway



Notes:

Depth (d)  
Velocity (V)

Relations based  
on Mannings Equation

$$Q = \frac{1.49}{n} AR^{2/3} S^{1/2}$$

Where:

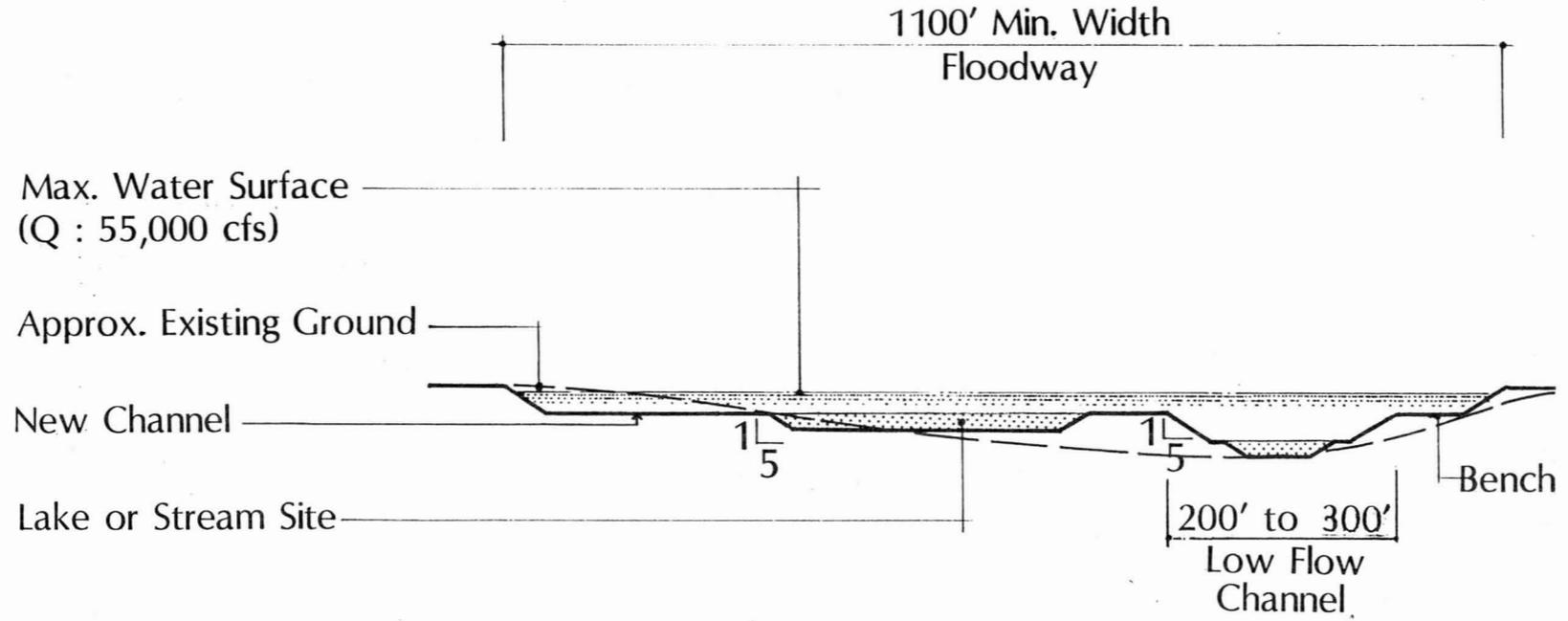
$n = 0.025$

$A =$  Cross Sectional Area

$R =$  Hydraulic Radius

$S =$  Slope

FIGURE 20 Cross Section of Floodway



ft/second limit.

In developing the grassed floodway, irregularities from the typical section may cause excess velocities. These irregularities, such as channel curves, stream locations, low flow channel characteristics and general landscape contouring, will require special stabilization. Numerous methods of erosion protection are available. Several of the more common are as follows:

Gabions - Inter woven wire baskets filled with stone.

Rip-rap - Large diameter graded stone and rock placed on side slopes and erosion prone areas.

Cut off wall - A buried concrete wall, placed normal to the flow, used to check erosion.

Soil cement - Mixture of sand, cement and local soil used to stabilize and protect side slopes and channel bottoms.

TABLE 8 Hydraulic Elements

Condition	100 Year Design Discharge (cfs)	Geometric Shape	Range of Width (ft)	Average Width (ft)	Depth of Flow (ft)	Velocity (fps)	Slope (%)	Approximate Mean Dia. of Material Transported (ft)	Number of Drop/Structures
Existing	200,000	Natural	550 to 5,000	3,500	17 to 25	4 to 15	nearly level to 0.5	0.02 - 0.40	None
Floodway w/Constant Section	55,000	Modified Trapezoid	1,100	1,100	7½ to 14½	6½ to 7½	0.1 to 0.2	0.17 - 0.35	7-8
Floodway w/Varied Sections	55,000	Variable	1,100 to 4,000	Varies	Varies	7½ max.	Varies	Varies	7-8
Sediment Basins	50,000	Modified Trapezoid	2,000 to 6,500		14+	Less than 1	Nearly Level	.004-.007	1 or 2

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Concrete lining - The traditional method of channel construction where there are extreme erosive forces.

In addition to these traditional methods of erosion control, there are many attractive new stabilization products available. Examples include: woven wire and brick mattresses which allow grass and vegetation to grow between the voids, and reinforced earth products which allow terracing of channel side slopes.

Design of erosion protection for critical sections of the floodway should be based on the individual requirements of the site. Aesthetics should be a major factor in any erosion protection design. The numerous existing and new methods should allow any protection to be blended into the floodway landscape.

#### Low Flow Channel

A low flow channel in the Rio Salado will transport runoff from small local flooding. The runoff will be primarily

from urban lands with significant points of contribution occurring at major arterial streets, the Tempe drain upstream from the I-10 bridge, Indian Bend Wash, Old Crosscut Canal near 48th Street, and two proposed Papago Freeway discharges in Phoenix.

The low flow channel will be an integral part of the grassed floodway and lake system. It will appear as a depressed section in the floodway located to one side of the floodway or meandering across the channel. At various locations the low flow channel will be integrated into the lake and stream system. The lakes are then used to store urban runoff, thus reducing the peak discharges and decreasing the requisite size of the low flow channel. At other locations it will be desirable to locate the channel away from environmentally sensitive areas. This could be accomplished by the use of side weirs, which would allow the flow to be diverted around the lake system.

The maximum capacity of the low flow channel is estimated to be 15,000 cfs with approximate dimensions of 200 feet wide by 10 feet deep, reduced significantly where storm water is routed through the lake system.

#### Lakes and Streams

Approximately 1400 acres of lakes and streams are proposed within the floodway. The lakes are characteristically long and narrow, creating a maximum of shoreline with a minimum of water surface area. Lakes should have shoreline stabilization treatment and be lined to reduce seepage. In areas adjacent to landfills, lakes should be sealed with an impervious liner.

All lake water should be kept in circulation to prevent insect infestation, stagnation and algae growth. This can be accomplished by maintaining a continual flow from inlet to outlet or recirculating flow through pumping systems. The lakes should be sufficiently

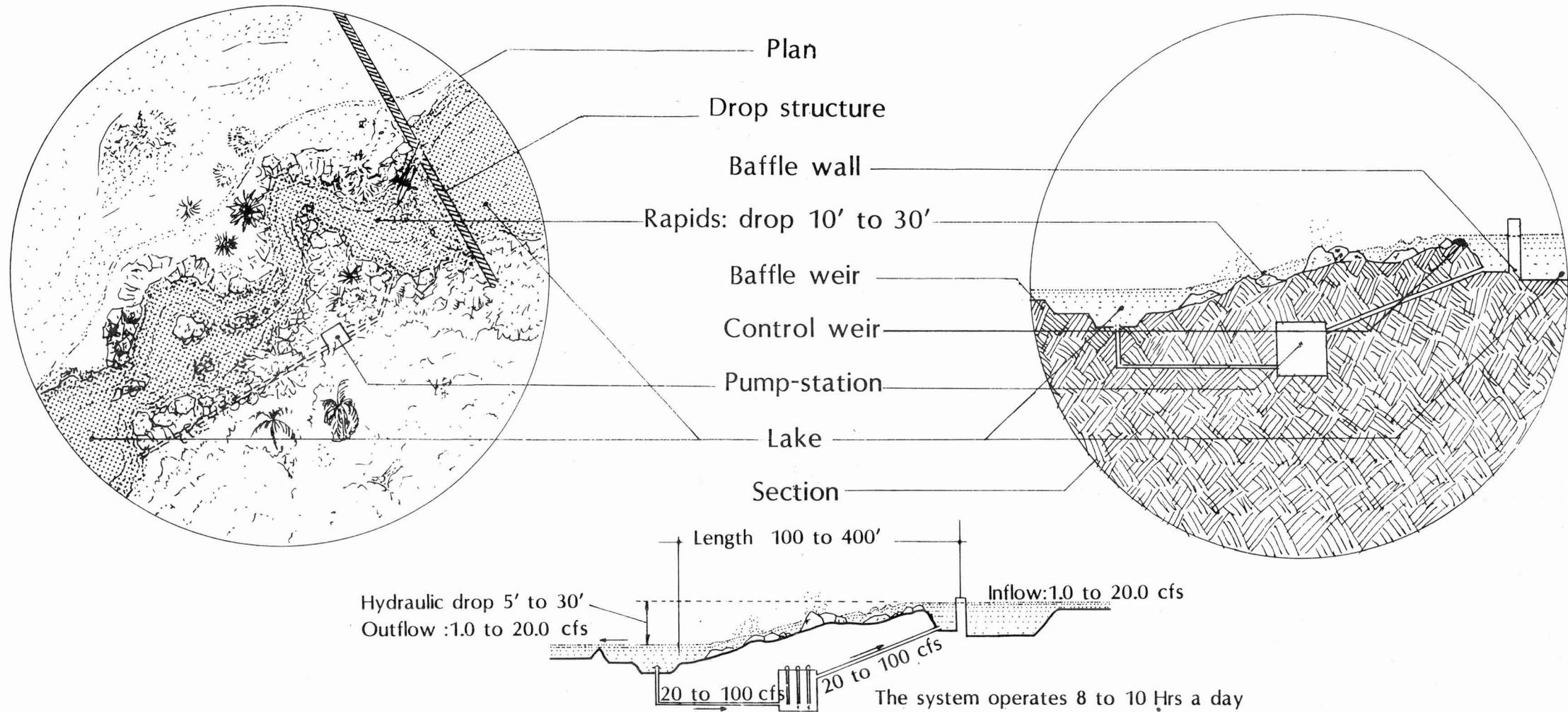
large to allow for storage of adequate volumes of irrigation water. This water will then be pumped from the lakes and used for grass irrigation.

The streams connect the lakes, providing fresh water inlets and outlets between them. The streams will also be used to transport irrigation water to the lakes. The estimated capacities of the streams range from 20 cfs (at Central Avenue) to 70 cfs at Dobson Road. These rates would allow sufficient continually flowing water for visual and environmental purposes.

The lakes and streams will provide a canoeing and boating course along the entire length of the project. The required size of stream for this purpose is approximately 15 to 20 feet wide and four feet deep. Such a stream, if placed on the normal slope of 0.1 to 0.2%, would carry approximately 400 cfs which would far exceed the 20 to 70 cfs required for irrigation purposes. The flow in these streams must be restricted by maintaining lesser slopes.



FIGURE 22 Typical Rapids Course



with the U.S. Army Corps of Engineers and the U.S. Department of Interior to promote a pilot study on the feasibility of such groundwater recharge.

#### Irrigation System

The grassed floodway would be irrigated with the most water-efficient methods consistent with occasional flooding. The water transported via the boat channel would be stored in the lakes during the day. At night, pump stations would deliver the water to sprinklers for application. All irrigation should be done at night to minimize evaporation losses.

#### Sedimentation

Without proper sediment control, the lakes within the streambottom may become full of sediment from local runoff or upstream releases. Sediment control consists of two elements. The first would restrict the inflow of sediment from tributary locations downstream from the dams. This may be accomplished by

installing check dams or sediment traps along the length of the greenbelt where sediment is a problem. Drop structures can also be used to control sediment transport.

Second, since sediment will also be carried by flows from upstream releases, a sediment basin would be located upstream of the recharge lake, near Country Club Road. It would be approximately 1-1/2 miles long and might range in width from 4,000 feet at Country Club Drive to 2,500 feet upstream at the entrance. At least one drop structure is needed at the exit of the basin. The larger sediments in transport will fall out in the basin and water will enter the floodway with velocities ranging from 4 to 7-1/2 ft/sec. These higher velocities should keep the remaining sediment in suspension throughout the rest of the floodway.

### PHASE I

Since we recommend that development commence during the first ten years, even before additional upstream flow control is in place, design for this first phase must accommodate flood waters up to the existing 100 year level of 200,000 cfs. Levees, already partially in place, must be completed. Additional armoring for Phase I will involve only about one mile of protection at both locations for early development. The heights and thicknesses of these levees will depend upon the topography and hydraulics. For example, protection on the north bank in Tempe, where the river converges with Indian Bend Wash, requires only a three foot levee.

Levees at the Phase I locations will have a different appearance from those common along the Rio now. They can be planted with trees and other plants which can withstand potential floods. This landscape is described in greater detail in the Recreation and Open Space section.

For the most part, the river bottom during the first 10 years will remain lined with cobbles, gravel, and coarse sand in anticipation of floods. These portions of the dry riverbed should, however, be cleared of unsightly debris and a path created for a horse trail. The special lakes that are shown within the riverbed in Phase I will be vulnerable to flood damage and could require frequent dredging or reconstruction until additional upstream flood control is in place.

### ADDITIONAL STUDIES

Additional studies needed for the flood management element include hydraulic analysis and sedimentation studies. These should be completed prior to any structural design.

The hydraulic analysis should consist of backwater analyses from approximately 51st Avenue to Granite Reef Dam. A backwater analysis consists of determining the level of flooding reached during events

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of different magnitudes. The major elements of such a study are:

- 1) Topographic mapping of the study area, and
- 2) Water surface profiles and hydraulic analysis for: a) existing conditions at 50,000, 100,000, and 200,000 cfs; b) design conditions for Phase I at 50,000, 100,000 and 200,000 cfs; and, c) final design conditions for Phase II at 10,000, 50,000, and 100,000 cfs.

Prior to the commencement of any stream bottom construction for lakes or grass lined channels, a detailed sediment study must also be done. A sediment study determines the amount of silt, sand and gravel that may be moved downstream during flooding. An excessive amount of such sediment would fill the lakes. This would consist of the following major elements:

- a. Field reconnaissance and collection of samples to determine grain size distribution;
- b. Laboratory testing of samples to determine grain size and other sediment characteristics;
- c. Computer modeling of sedimentation to determine aggradation and degradation characteristics;
- e. Computer and laboratory modeling of the sedimentation basin; and,
- f. Design of sedimentation system, including sedimentation basin, size, and locations of other sediment control devices.

Another flood-control issue will be considered as the individual developments are designed. While the 100-year floodplain is the legal limit within which permanent structures cannot be built, consideration will also be given to providing a higher level of protection for some features.

Major developments, especially those involving concentrations of people and high value, can be designed to provide protection even up to the 200-year flood level. These additional studies will occur as the various projects are designed.

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# Water

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## INTRODUCTION

Water in the Salt River Valley is a limited resource for which agricultural, municipal and industrial users are in competition. In Maricopa County, about 70% of the water is used for agricultural irrigation and 30% for municipal and industrial demands.

Current irrigation and domestic use of surface water and groundwater has resulted in annual groundwater overdrafts of approximately 1,000,000 acre-feet per year (af/yr). Measures have been adopted to stem this annual depletion and reduce the demand to a safe yield. Central Arizona Project water will add approximately 280,000 af/yr to the municipal supplies of the Central Valley.

The "1980 Arizona Groundwater Management Code," provides for bringing the active management areas into safe yield. As a part of this effort, cities are required to implement con-

servation measures, in order to reduce their percapita consumption.

Clearly, these issues directly affect the Rio Salado Project, which must achieve maximum conservation, both actual and perceived.

The principal need for water will be for irrigation and lake evaporation. Non-potable water can be used for this. Domestic water will come from the municipalities or water companies within which the project is located. Estimated annual domestic demands are included for planning purposes.

Three major categories of non-potable water, have been investigated: groundwater, surface water and effluent. A detailed description of each potential source is presented in the Appendix. A summary of water sources and conditions is given here.

The Appendix describes over 33 major sources of water, potentially available for the project. Complex social, political,

technical and economic constraints are associated with each source.

The major available water categories include: a) land-fill leachate; b) poor quality groundwater; c) surface water from the Salt River Indian Community, CAP - State Land Department, and CAP - Municipal Sources; and, d) effluent from the Dobson Road Disposal Plant in Mesa, the Falcon Field Disposal Plant, the 23rd Avenue Disposal Plant in Phoenix, and small disposal plants located along the Salt River.

## DOMESTIC WATER DEMAND

Estimates of domestic water consumption were computed by multiplying proposed acreages by the use factors specific to each activity. The average annual demand for potable water in years 1-5 will average 900 acre feet, rising to 3,400 acre feet in years 11-15, and 8,300 acre feet by year 25. Detailed tables which outline the domestic requirements for the various

municipal regions within the Rio Salado boundary are in the Appendix and are summarized here in Table 9.

The estimated domestic water demands identified in this report must be reviewed against the estimates that were used as a basis for allocation of CAP water to the various municipalities. If it can be demonstrated that the Rio Salado Project will create a net increase in population and domestic demand, the District and/or the cities may be justified in requesting CAP reallocations, based on the adjusted populations. Reallocation would be possible if contracts for all CAP water have not been executed.

Generally, however, any major water treatment facilities and/or water distribution system must be provided by the respective municipalities to meet the requirements within their service areas.

**TABLE 9 Domestic Water Requirements: Average Annual Demand**

(acre feet - rounded)

<u>Area</u>	<u>Years</u>	<u>1-5</u>	<u>6-10</u>	<u>11-15</u>	<u>16-20</u>	<u>21-25</u>
Phoenix		460	1,020	1,630	2,890	5,320
Tempe, Mesa, and S.R.P-M Indian Community		470	1,040	1,730	2,310	2,970
Totals		930	2,060	3,360	5,200	8,290

**NON-POTABLE WATER DEMAND**

The non-potable water demands for the Rio Salado Project have been estimated for each five year period of construction, assuming a 25-year total construction period. Detailed tables of this demand are in the Appendix and a summary of these estimates is shown in Table 10.

The computation for demand assumes an irrigation application efficiency of 80% or 4.5 ft/yr, based on wide use of

Bermuda grass, and a lake evaporation rate of 6.25 ft/yr. The demand for non-potable water is minimal in the early years prior to the full construction of the riverbed: 1,800 acre feet per year in years 6-10. When the lakes and grass are installed this figure jumps to 17,000 acre feet in years 11-15, and culminates at 21,000 acre feet by year 25.

Principal Sources of Non-Potable Water

The principal sources from which the Rio Salado water acquisition strategy is derived fall into each of the three major categories-- groundwater, surface water, and effluent. It is important to point out, however, that full implementation of this strategy and exploitation of these sources may be affected by political, legal and technical considerations.

For example, severe restraints have been placed on the use of groundwater by the 1980 Groundwater Code (A.R.S. 45-410 et seq.). Surface water rights are controlled under different sections of ARS Title 45 and under federal law and judicial decree.

Rapidly changing water use patterns in the Salt River Valley will also have a major impact on the quantities and sources of water in future years. What the next 25 years will bring cannot be accurately foreseen. There are sources of water now available to supply early demands adequately. Beyond that, development of water supplies must be addressed on a case by case basis, as the project matures.

Groundwater

Several opportunities exist for the use of groundwater. Perhaps the most promising is poor quality water that may not be useful for other purposes. It exists naturally as water with a high level of total dissolved solids (TDS)

and also as leachate that has been polluted by materials in existing landfills. Groundwater of higher quality may also be available under certain conditions. All groundwater use will be governed by the Groundwater Management Act.

#### Landfill Leachate

Landfill leachate has potential as a source of non-potable water for the Rio Salado. It has two major advantages. First, it is water that may be polluted and has no value for typical uses. Second, by utilization of this water the District can assist the community in cleaning up pollution sources which threaten the groundwater.

The major issue in using landfill leachate is our ignorance of the exact nature of pollution and toxic substances in each landfill. The type and level of treatment required for each site is yet unknown. Treatment methods may be complex and expensive.

**TABLE 10 Summary of Non-Potable Water Requirements: Average Annual Demand**

(acre feet rounded)

<u>Use</u>	<u>Years =</u>	<u>1-5</u>	<u>6-10</u>	<u>11-15</u>	<u>16-20</u>	<u>21-25</u>
Waterways, lakes & ponds in riverbed		125	585	7,125	8,690	8,690
Water features on riverbanks		45	395	595	755	690
Grass channel		180	180	7,065	8,190	8,190
Parks		445	590	1,010	1,290	1,575
Golf courses		--	--	750	905	1,375
Fairground		--	--	375	375	375
Resort Hotels		--	75	205	205	205
Totals		795	1,825	17,125	20,410	21,100

Note: This table refers only to water required for irrigation and usage on land not within the Salt River Project service area.

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The potential yield from this source is also unknown and must be determined on a site by site basis. The yield from this source will probably decrease with time. Its use will require the acquisition of a poor quality groundwater permit from the Department of Water Resources. Water quality regulations of the Department of Health Services must also be followed.

#### High TDS Water

Groundwater with a high concentration of total dissolved solids is another potential source. It is generally not suitable for typical use but could fulfill some needs of the Rio Salado. If the entire requirement of 21,000 af/yr of non-potable water were drawn from this source, approximately 13 deep wells, producing 1000 gpm each, would be required. Studies have shown that large quantities of this water exist within the Rio Salado area downstream from Mill Avenue in Tempe. The use of this water source would also require a poor quality

groundwater permit from the Department of Water Resources.

The issuance of poor quality permits would be guided by the general provisions of the Groundwater Management Act and by the specifics of the management plan of the Phoenix Active Management Area. As the applicant, Rio Salado would be required to demonstrate that the water has no other beneficial use. The permit could be terminated if the water quality improves or if the water can be put to another beneficial use.

#### Other Groundwater

Other options for use of groundwater also exist. Three methods are possible. First, the District could purchase Type 2 Non-Irrigation Grandfathered Rights and transfer these to existing wells or new wells within the Development District. As provided by the Groundwater Management Act, these rights are based on non-irrigation withdrawals of groundwater in existence when the AMA is designated. They

may be purchased and transferred to any location and used for any purpose except irrigation. These rights would permit the pumping of any water.

Secondly, the cities can supply water for the project from new or existing wells along the Salt River. The Groundwater Management Act permits pumping by cities from existing or new wells within their service area. However, the AMA Management Plan will prescribe a total water budget for each city. Thus, the assignment of water to the Rio Salado by the cities must be within this total amount.

Third, the Groundwater Management Act also provides for a permit for general industrial use, which includes all non-irrigation uses except mineral processing and subdivisions. The non-potable needs of Rio Salado would fall within this definition. However, the issuance of such a permit is subject to several conditions that would have to be evaluated.

#### Surface Water

The Central Arizona Project is another potential source of water for non-potable use. Four possible scenarios could provide CAP water to the project. First, an allocation could be made to the Rio Salado of a portion of any surplus water resulting from the inability of any previous allocatee to contract for the water. Second, and perhaps more likely, would be an interim use of CAP water through purchase from an allocatee that did not need the water in the early years.

A third method of acquiring CAP water would be through an allocation of a portion of the newly-developed water for environmental enhancement and mitigation. This water would be released from the Plan 6 dams in order to mitigate environmental damages caused by their construction. Studies are underway to determine if such values could be created in conjunction with the Rio Salado project.

The fourth possibility relates to the acquisition and development of lands in the District by the State Land Department. The Department has been allocated 39,000 af/yr. If the District can show the economic benefit of using this water to develop holdings of the Land Trust as proposed later in this plan, it might be granted some of this CAP water. By law, only 10% of the allotment (3900 af/yr) go to any one project without approval of the Arizona legislature.

#### Effluent

Effluent is probably the most promising source for the long range needs of the project. As groundwater and other sources are phased out, the continual growth of the Valley should create sufficient effluent for ultimate requirements. The primary sources include: the proposed Dobson Road Plant expansion in Mesa (10,000 af/yr), the proposed Falcon Field Plant in Mesa (7,000 af/yr) and the 23rd Avenue Plant in Phoenix (30,000 af/yr).

The cost of treatment to remove pathogens may make this source expensive as compared to groundwater or surface water. Permits from EPA may also be required. A number of technical possibilities exist, including an additional stage of treatment, or filtration through the ground. However, groundwater laws concerned with both quantity and quality may complicate and restrain injecting and pumping of effluent from the riverbed as a means of purification.

Several pending lawsuits could also affect the cities' rights to sell effluent. If the cities are allowed to sell the effluent, they must then be convinced to maintain, and in some instances, expand their facilities rather than close them down as has been recommended locally on numerous recent occasions.

#### Other

Other sources are available and should be investigated on an individual basis: the purchase or lease rights from the

Salt River Indian Community; the payment of back assessments to bring non-project areas under the jurisdiction of the Salt River Project; and the possibility of some recharge of both CAP and SRP water.

## WATER ACQUISITION STRATEGY

The water acquisition strategy matches the non-potable water requirements of Rio Salado with the primary potential sources. This strategy forms the basis for a more detailed water acquisition plan to be prepared after completion of the master plan.

#### Years 1 - 5 (800 ac.ft/yr)

Groundwater would be used to begin the early development of the project. Emphasis would be placed on the use of leachate from landfills and water with a high level of total dissolved solids. This water would be pumped under the authorization of poor quality groundwater permits from the

Department of Water Resources. Industrial use permits and the possibility of Type 2 Grandfathered Rights would be investigated. Allocation of water from the cities would also be pursued. The groundwater would be augmented by surface water from the CAP if such arrangements can be made, either through the reallocation process or purchase on an interim basis.

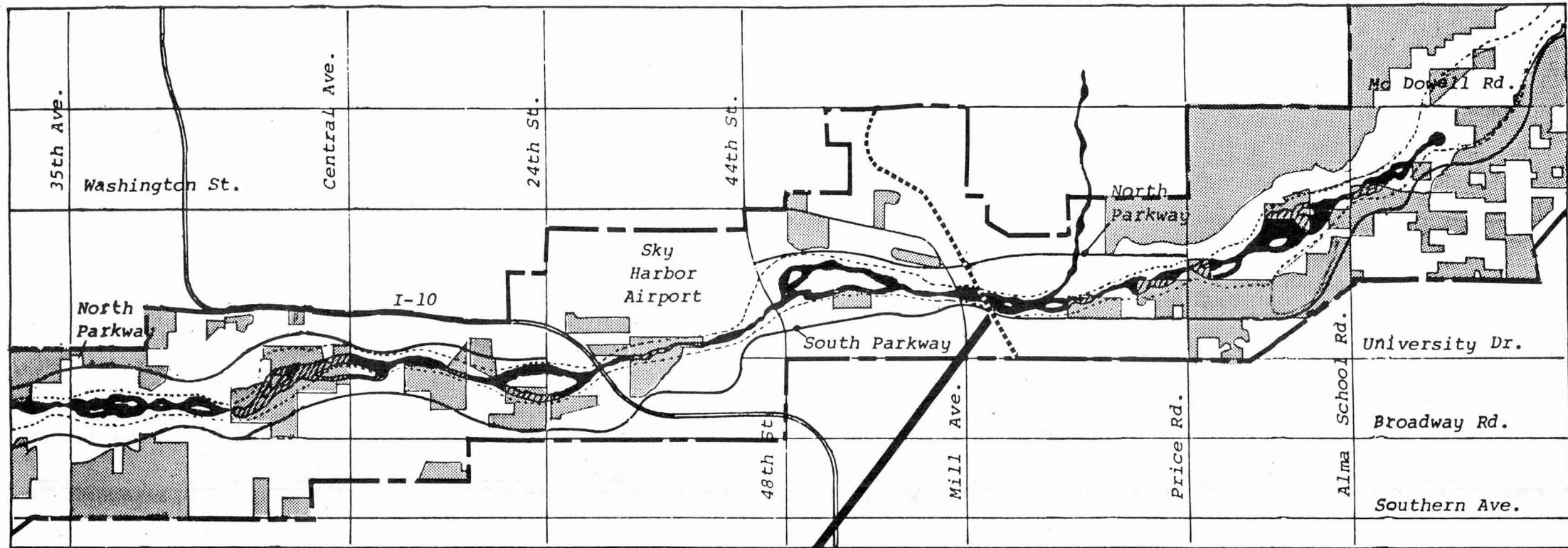
#### Years 6 - 10 (1800 ac.ft/yr)

Landfill leachate and high TDS water would continue to be used. The use of other groundwater, if previously used, would continue, although to a lesser degree. The use of CAP water, if available, would also continue. The use of sewage effluent would be initiated, with the early source being the Dobson Road treatment Plant in Mesa.

#### Years 11 - 15 (17,000 ac.ft/yr)

As the riverbed park is developed, the water needs of the project will increase dramatically. Effluent from

FIGURE 23a Water Availability and Water Quality

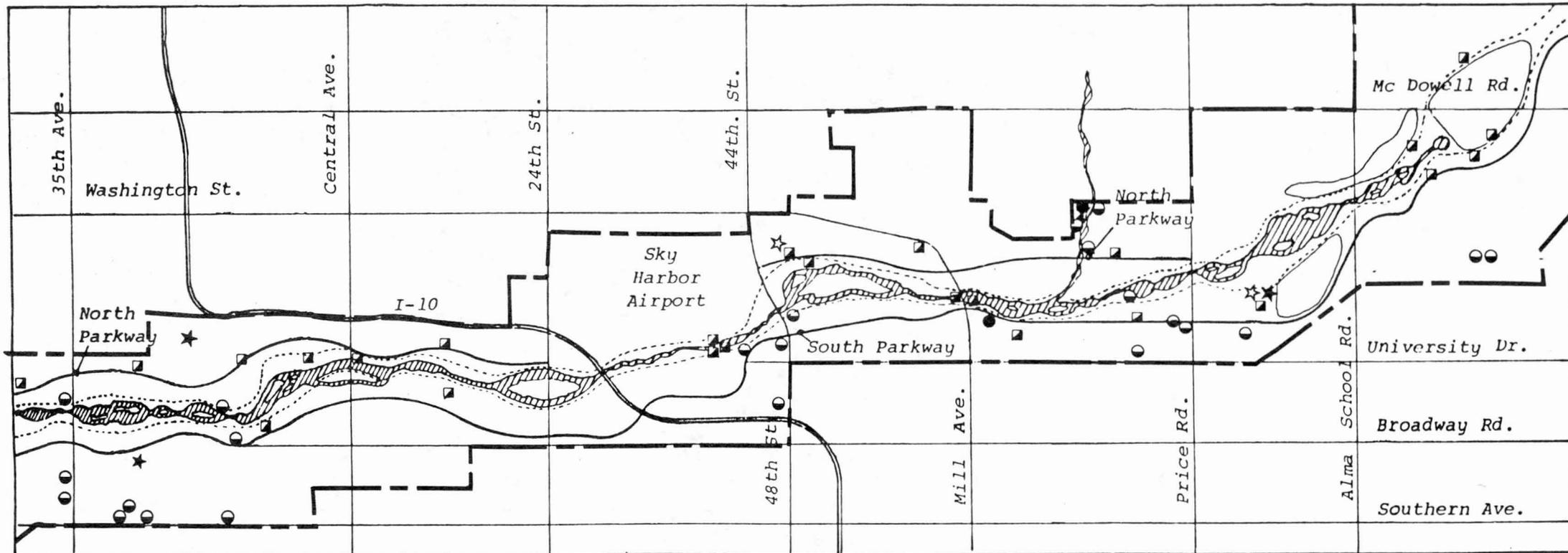


 Land with potential grandfather rights

Area west of dotted line: concentration of total dissolved solids in water 1000-3000 mg per liter

Area east of dotted line: concentration of total dissolved solids in water 500-1000 mg per liter

FIGURE 23b Water Availability and Water Quality



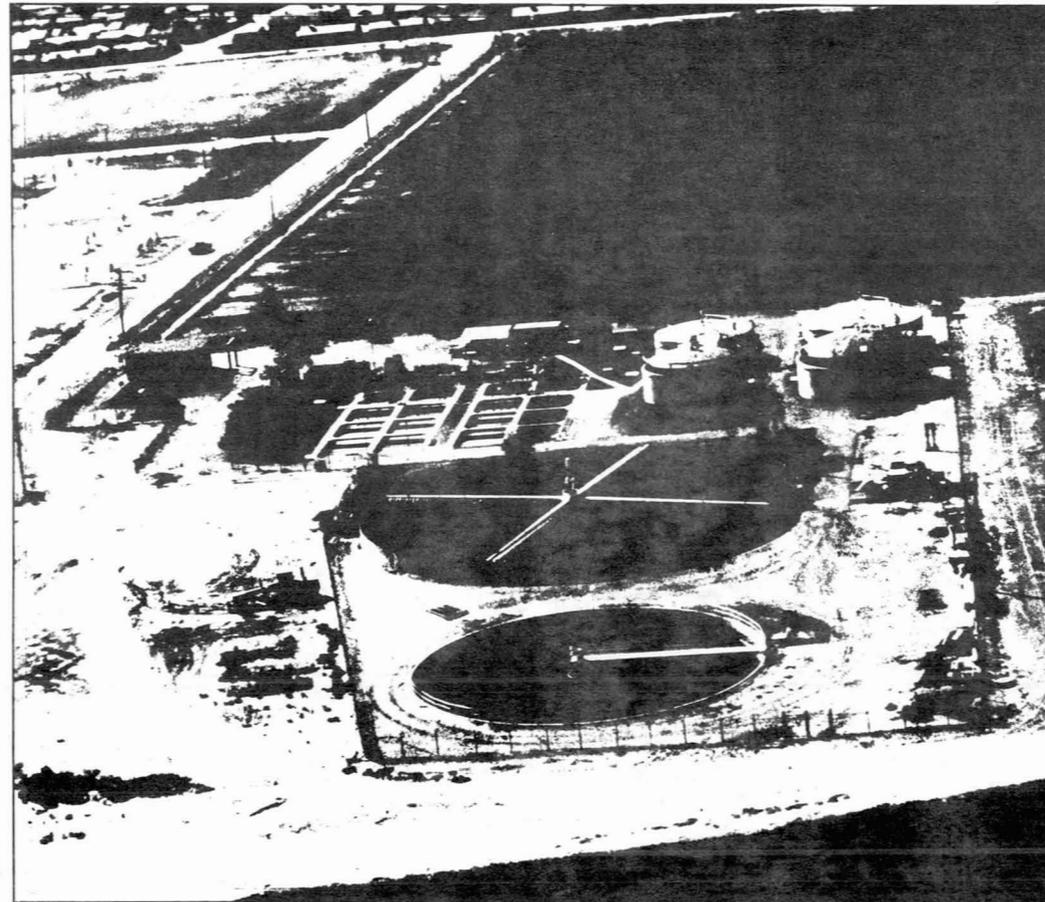
- Landfill & waste sites
- ★ Existing wastewater treatment plant
- ☆ Proposed wastewater treatment plant
- City wells
- Corporation & private wells

the Dobson Road plant in Mesa and the 23rd Avenue plant in Phoenix would begin to be the major source of water. A maximum use of CAP water, if available, would occur. Development on state lands would use a portion of the CAP allocation previously made to the Trust. Use of CAP water allocated for environmental enhancement or mitigation would begin. Landfill leachate, high TDS, and other groundwater would begin to be phased out.

Years 16 - 20 (20,000 ac.ft/yr)

The use of Groundwater would be discontinued. Effluent would provide most of the water. Supplies from the Falcon Field plant in Mesa would be added to the two initial plants. Package treatment plants associated with the Rio Salado developments would provide a portion of the effluent. Interim uses of CAP water would be phased out. The use of CAP water from permanent allocations or environmental enhancement would continue. Use of the State lands CAP alloca-

**FIGURE 24 Dobson Road Water Treatment Facility**



tion would also continue, if available.

Years 21 - 25 (21,000 ac.ft/yr)

Effluent and some CAP water would now supply the total non-potable water demands of the project. Effluent would continue to come from the plants at Dobson Road, Falcon Field, 23rd Avenue, and other sources then in existence. Package treatment plants would continue to be incorporated into the developments. Interim use of CAP water would cease. The use of CAP water from permanent allocations or environmental enhancement, if previously obtained, would continue. Use of the State lands allocation would also continue if available. Leachate might be pumped if required to maintain other groundwater quality.

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## WATER CONSERVATION POLICY

Underlying all of the Rio Salado developments will be a policy of conserving water in a manner consistent with the overall water supply and demand situation in the region. The project will be designed to be a demonstration of methods of creating desirable landscapes with low water use. These methods can then be used elsewhere, thus contributing to water conservation over a broad area.

This water conservation policy has several elements which will guide the preparation of the master water plan. Briefly described, these elements are:

1. All water used for irrigation and recreational water features will come from non-potable sources. No water that is usable for domestic needs will be used for these features. As described in the water acquisition strategy, the

major sources will be poor quality groundwater and treated waste water.

2. The recreational water features of the project--including the lakes, ponds, and streams--will be designed to achieve the maximum efficiency in water use. Creative designs will increase their impacts while using relatively small amounts of water. Recirculation features will provide for the reuse of water within the project's overall system. Some of the water features will be designed to also function as groundwater recharge facilities, thus assisting in the replenishment of the groundwater supply for the region.
3. Landscaping and vegetation will be dominated by the use of low-water plants. Drought-tolerant native plants requiring little care and water will be used. A rich and varied landscape can be created

in this manner. Higher water use plants will be used sparingly in selected "oasis" areas to provide focal points for certain activities. The only exception to this general rule will be the need for grass-lined channels to provide stability in the event of flooding. The detailed design of these channels will use the minimum amount of grass possible. As the design proceeds, a less water-intensive solution will be sought.

4. The average annual demand for non-potable water as described in this plan is considered to be the maximum amount needed. Detailed designs are expected to lower these figures. All water use will be strictly justified either by public recreational demand or economic benefit.

## ADDITIONAL STUDIES

Prior to the start of construction of any water elements presented in this plan, several detailed studies need to be performed.

First, the landfill leachate and poor quality groundwater sources will need to be investigated on a site specific basis. Major items of the investigations would include: water quality evaluation, groundwater depletion analysis, projected yield, design of monitoring and pumping wells, treatment process design if required, drilling programs to locate unidentified landfills and other aspects which may be required by the Department of Water Resources in the permit application process.

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Next, a project of this magnitude will require a master water plan. The preparation of this water plan is of highest priority and will begin immediately upon approval of financing for the project. The non-potable demand of 21,000 af/yr, is roughly equivalent to the demand of a community with a population of 100,000.

water management plan should be studied in greater detail.

New water sources, or changes in the volume of expected flows may require revisions to the size and location of individual water features. The overall plan should provide for alternative routes, storage facilities, transmission lines and appurtenances to allow for maximum flexibility. Major wells, treatment facilities, storage lakes and pump stations should also be designed to allow for the modification of supply and demand.

Finally, the impact of recharge programs and the impact of the master plan on other water users and on the ground-

# Social

The Rio Salado planning area currently has a population of some 50,000 residents. A detailed summary of socio-economic characteristics is in Appendix A. Highlights are shown in Table 11.

Most of the Phoenix neighborhoods within the planning area are modest in character and amenities. The development of the Rio Salado and its banks will offer these residents increased nearby job opportunities, as well as new recreational and cultural facilities. The plan proposes programs to help homeowners and renters revitalize their housing and increase neighborhood stability. There will be a new technical school to help prepare residents for new jobs. The quality of life for those who live in or near the District should be much improved.

The Rio Salado can be a model for social as well as physical reclamation. However, this will only happen if concerted action is taken from the beginning of development. Otherwise, the Rio Salado could become a

**TABLE 11 Demographic Highlights**

	Overall District	Phoenix	Tempe	Mesa
Total Population	50,350	24,164	9,452	10,711
Median Age	23.8	23	22	25
Racial Composition:				
White	58%	30%	89%	89%
Hispanic	29%	33%	7%	10%
Black	10%	19%	2%	<1%
Indian	3%	1%	<1%	<1%
Other	--	17%	2%	1%

liability for the very population which should be most directly served.

## CULTURAL

The project area is richly endowed with ethnic and cultural groups, particularly in the Phoenix neighborhoods. The population includes black, white, hispanic, Indian and Asian citizens. Since members of one ethnic group often lack knowledge, understanding, and

appreciation for others, the development of the Rio Salado offers an opportunity to increase ethnic and cross-cultural understanding.

The primary mechanisms through which this can be achieved are the proposed Exposition and the Southwest Cultural Center. As part of the celebration of water and its uses, the Exposition should include displays of the techniques of water use and management developed by cultures throughout the world. Exhibits

could include descriptions of the original irrigation system in the Phoenix area as laid out by the Indians. This could be coupled with site visits to the remaining traces of this system on the banks of the Rio. The extensive water engineering of the Spaniards, originally learned from the Moors and put to use throughout the Southwest, would also be on display, together with their more decorative uses of water, as in the Alhambra.

The focal point for learning about these local cultures during and after the Exposition, would be the Southwest Cultural Center. Constructed as part of the Exposition, it would continue as a publicly subsidized institution. It should be a performing arts center as well as museum, with an emphasis on local, amateur participation. It should also be a center of cultural conservation. The histories, philosophies, values and life-styles of past and present could come to life in theatre, song, and dance. The personal stories of how black

people, many of whom must have previously been slaves, came to live in Phoenix in 1870 could be presented. The intricate, but simple, approach to life of the local Indian tribes and the meanings of their various symbols and ceremonies could be demonstrated and discussed. The rich Hispanic culture could be presented and explained.

The wonderful flower gardens, which were developed by the Asians who migrated here about fifty years ago and which are now rarely seen, could be displayed on the grounds. Some exhibits would be permanent, some temporary, and some would travel among schools, churches, and other forums near and far. Models for such an institution include the Anthropological Museum of Mexico City, Institute of Texas Cultures in San Antonio, Texas, and the Polynesian Cultural Center in Hawaii.

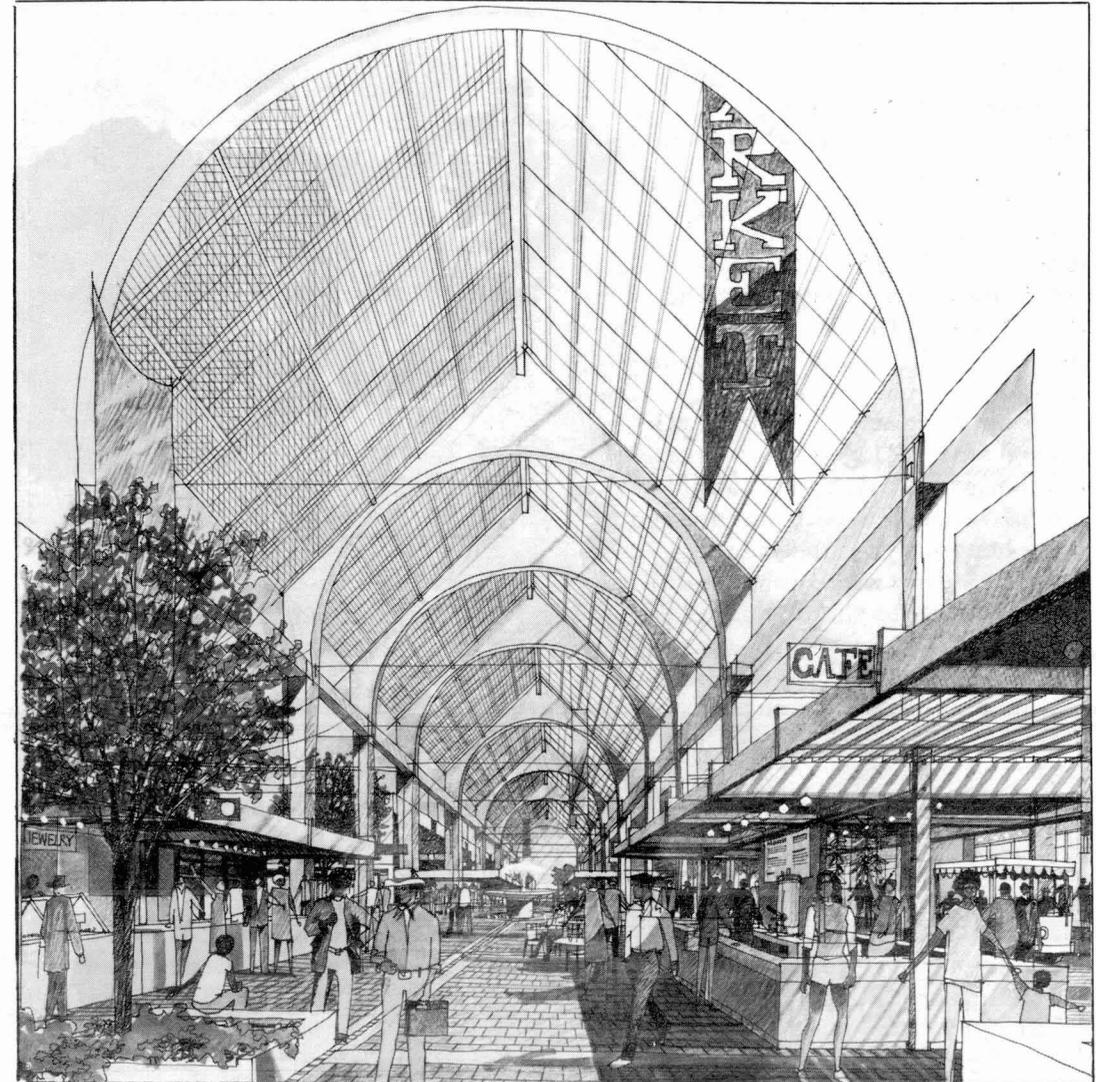
Unlike existing models, however, this Cultural Center can also serve as a trade center and a basis for stimulating local economic development.

A vendors market where new, small entrepreneurs can produce and sell hand-made goods, ethnic foods, flowers and the like can be established both inside and outside the Cultural Center. This ethnic market place, illustrated in Fig 25, can help small businesses to get established while adding yet another attractive feature. The highly successful summer ethnic festival held weekly on the central waterfront in Detroit is an example of the broad appeal of this concept.

## EDUCATION

The development of the Rio Salado could result in a more efficient use of existing school buildings, some of which are currently underpopulated. Some new schools will be needed, however. The plan proposes mixed use development including 16,000 new housing units in the first 25 years. Although market projections for this area suggest that family sizes will then be

FIGURE 25 Ethnic Marketplace



smaller than they are now and that much of the new housing is likely to be taken up by singles and childless couples, the school age population will nonetheless increase by approximately 8,000 within the first 25 years. A sufficient number of conveniently located, good quality schools, will have to be in place in order to attract new residents to the area or to attract developers to build the housing in the first place.

#### Elementary Schools

To accommodate this increased demand, four or five new elementary schools are proposed in the City of Phoenix and one is proposed in Mesa. The school age population increase in Tempe is expected to be minimal and easily absorbed into existing schools.

The perceived quality of schools in this part of Phoenix will also need to be addressed. State education officials indicate that standardized test scores of children in these schools have

been favorable and that the perception that quality education does not exist in South Phoenix is inaccurate. If this is true, a special campaign designed to publicize the good qualities and successes of these schools may be needed. If not, a special task force may be needed to identify the actual shortcomings and assist school officials in overcoming them.

#### Secondary School

The increase in school population will also affect the secondary level. The plan therefore proposes a Rio Salado alternative high-tech secondary school at the Exposition site on Central Avenue. Its purpose will be to train young people in the new technologies of the present and future, preparing them for entry level jobs in industry.

The proposed school is similar in concept to the successful Skyline Campus in Dallas. This unique school serves the immediate geographical area, with an enrollment of roughly

1,000. Second, the career development component provides specialized training for secondary school students drawn from all high school students in the city. This component offers both half-day and full-day programs. Students in the half-day program attend Skyline for specialized training and return to the neighborhood schools for comprehensive courses. The full day students spend one half-day in their career development program and one half-day in the comprehensive school component. The career development component has approximately 2,750 students. Finally, the adult education program operates in the evening and on weekends and has approximately 1,500 students.

The Skyline school was initiated by the Education Committee of the Dallas Chamber of Commerce in cooperation with the Dallas Independent School District. Construction and furnishing of the new facility was financed through a city bond issue at a total cost of \$21.5 million in 1972, with

equipment alone being \$5 million. A pilot project is also underway in San Antonio, Texas. As in the Dallas model, the program is being planned by a committee of businessmen and community leaders, working with educators from the independent school districts.

The new Rio Salado school is proposed for the Central Avenue site to symbolize the joining of North and South Phoenix in preparing young people for the jobs of the future. There it could serve existing lower income residents, who might otherwise advance to a life of unemployment and public assistance, and also attract residents to new housing. It would be a project around which business and community leaders can join together with educators to achieve results in a relatively short period of time. This project will require the approval and full support of the Phoenix Union High School District and the proposed site will require an affirmation by the voters within the District. Of course, all school

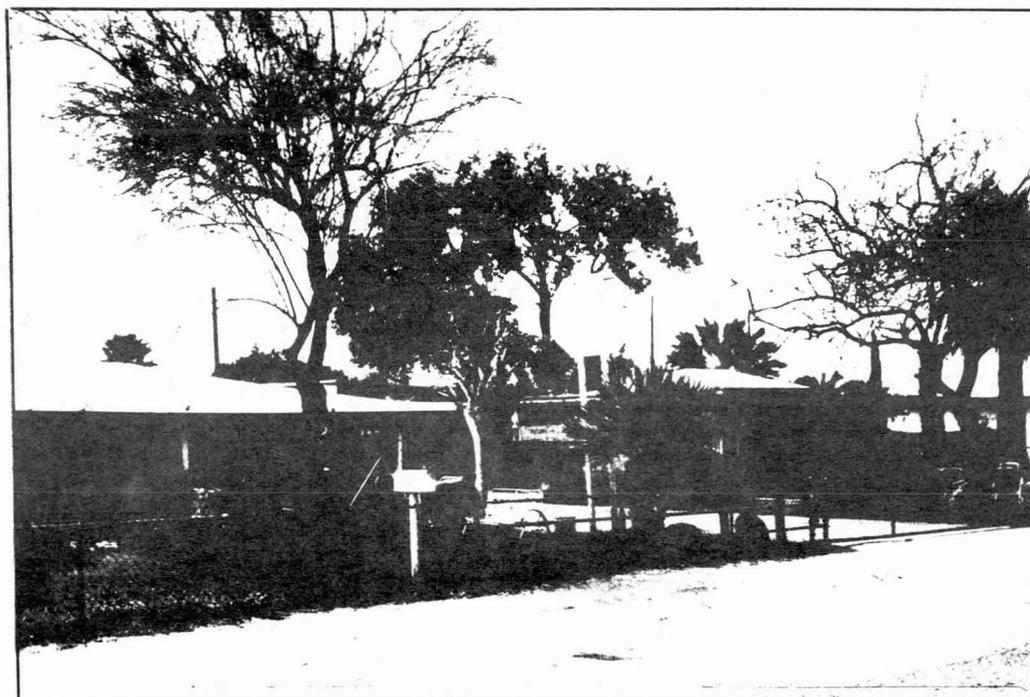
facilities and programs will continue to be the responsibility of the appropriate existing school district.

## HOUSING

There are a number of established residential neighborhoods throughout the Rio Salado planning area. A fairly detailed inventory of the locations of these neighborhoods and their physical conditions is given in Appendix A. Many of them are suffering from slow deterioration and some are being taken over by industries and other non-residential uses. These changes are particularly prevalent within the City of Phoenix, where family incomes are low.

Despite this, many of these neighborhoods are relatively stable, and family and community structures are strong. Recent surveys show that residents of Phoenix's inner city visit family members and close friends several times per week. This network is

FIGURE 26 Stable Neighborhood



very important to the well-being of these residents.

The reclamation of the Rio Salado could cause large scale displacement and a resulting breakdown of this social structure. Absentee landlords and low income homeowners, now

unable to maintain their homes adequately, will be tempted by speculators making attractive offers. This type of subtle displacement, often referred to as "gentrification," has been more severe over the past two decades in most large cities than has direct

relocation.

Displacement has negative effects, not only on the individuals who are pushed out, but on the greater community as well. Most families are usually unable to find decent, affordable replacement housing. They go from bad to worse. The loss of familiar surroundings disrupts social networks and contributes to the breakdown of lives. An increase in delinquency, alcoholism, and other social problems results.

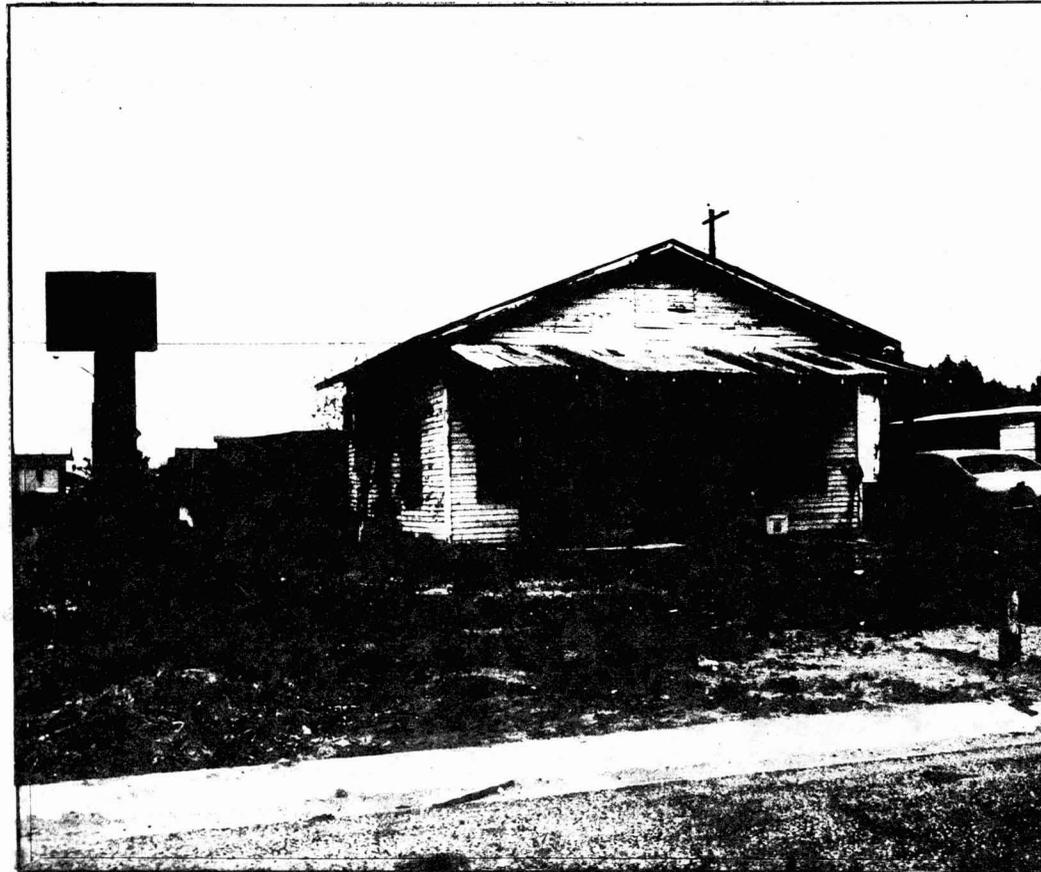
But the Rio Salado could be a model of how these negative effects can be minimized. An anti-displacement strategy would begin by strengthening the economic position of existing residents in targeted neighborhoods. With help, they will then be more able to withstand the pressures of speculation and gentrification, and remain in their units or in the immediate area if they so desire. Only after the existing community is strengthened financially should public im-

provements be made in the form of street paving, lighting, landscaping, etc.

Several programs of action are needed to mitigate potential massive displacement. They are:

- rehabilitation loans and grants to existing homeowners,
- exterior fix-up programs, such as free or inexpensive paint jobs,
- downpayment loans and grants to renters to buy their units or other vacant units in the area,
- subsidized construction of new units to replace those which are not feasible to repair,
- counseling programs to help prepare renters for single and/or cooperative homeownership and management,

FIGURE 27 Deteriorated Neighborhood



- consolidation of scattered vacant parcels for efficient new development, and
- stimulation of moderately priced, mixed income in-fill housing.

Neighborhoods that seem to require this program of action are labelled as rehabilitation areas on the plan. They are mostly located south of the river in Phoenix, between the new parkway and Broadway Road and from 7th Avenue to 32nd Street. On the north side, the neighborhood between 12th Street and 16th Street is also proposed for rehabilitation. Capital and program costs for these actions are included in the cost estimates and funding strategy.

A related concern is the possibility that the Rio Salado development will cause a greater than normal rise in residential property taxes because of its influence on surrounding property values. While these influences will create major benefits, the concern is with the impacts on

fixed-income residents who may find the taxes on their homes raised to unacceptable levels. Two factors will likely solve this potential problem. First, existing state law limits increases in homeowner property values for tax purposes. Second, the rising taxable value in the surrounding area will increase the base against which the tax rate is levied and could actually reduce the tax bill on residential property. Notwithstanding these factors, more attention must be given to this potential problem. A more detailed analysis will be made. If needed, appropriate mechanisms will be designed to assure that homeowners are not forced from their homes because of higher taxes caused by the project.

While every effort has been made in the planning to strengthen existing residential areas, some direct displacement will be necessary. Scattered housing units lie in the path of new construction of roadways or of new development between the river and the

parkway. This occurs mostly along the southern edge of the river in Phoenix, where the parkway would be built, particularly from 7th Avenue to 32nd Street. A small neighborhood is also affected north of the river from 9th Avenue to Central Avenue, causing the relocation of approximately 50 families.

We have also concluded that some neighborhoods outside the parkways are so nearly completely taken over by industry and so adversely impacted by airport noise, that it would be best to make it possible for the remaining low income families to relocate into new or improved residences. The process is made more tolerable here by creating affordable replacement housing close by existing housing prior to the necessary move. Homeowners should also receive fair compensation for their property. This would allow these industrial areas to develop in a more efficient and less disruptive manner. Neighborhoods that should be discontinued north of the river

are from 7th Street to 12th Street and from 16th Street to 29th Street. South of the river a completion of the transition from housing to industry is also recommended from 32nd Street to 48th Street.

In addition, approximately 50 mobile home dwellings at 24th Avenue need to be relocated to a site just south of the parkway. Finally, 15 families that currently live on County land, east of Scottsdale Road, should be assisted to relocate to improved housing in residential areas of Tempe.

In all, approximately 300 families would be gradually relocated over 20 years as a result of this new development. For a project of this magnitude, this amount of direct relocation is extremely low.

A detailed relocation plan will be prepared prior to the displacement of any of these 300 families. This plan will include the identification of specific areas and time-

tables. It will contain detailed procedures to assure an equitable and orderly relocation of the affected persons, including counselling and assistance programs. Contracts with qualified community or municipal agencies may be used to provide the relocation services.

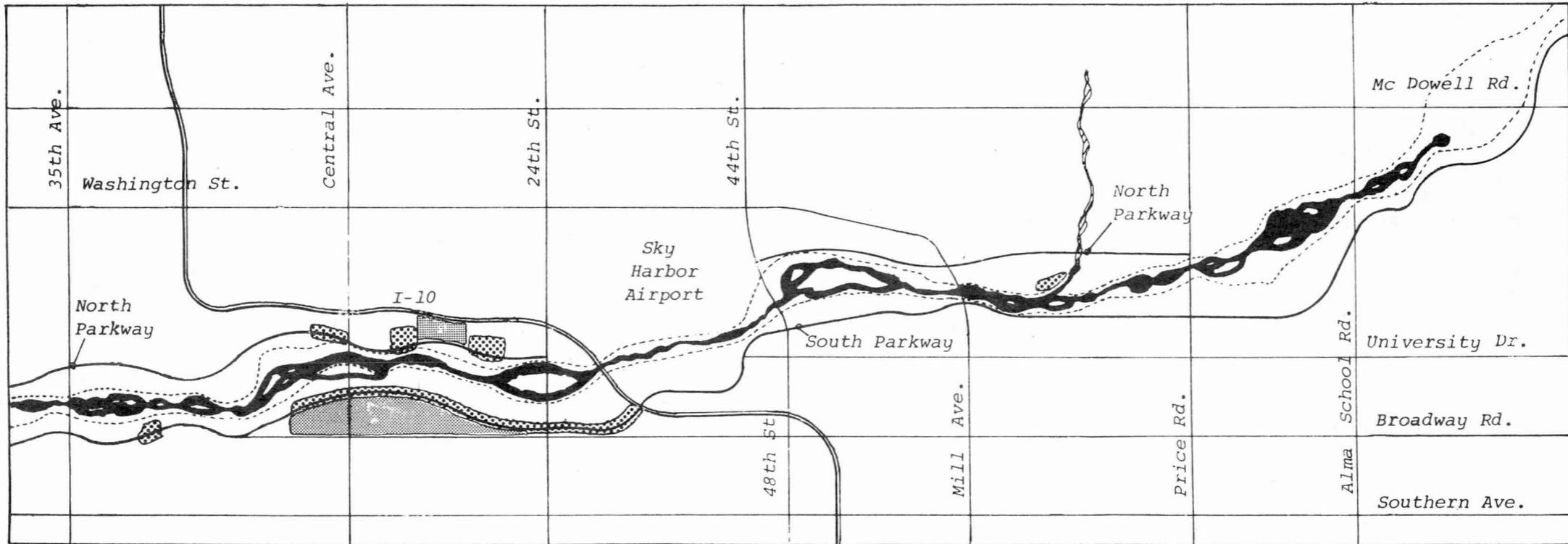
A neighborhood organization will be created in each area that will be directly impacted. These organizations will serve as mechanisms for community participation. The first step in any neighborhood that may be subject to relocation will be to conduct a vote of the neighborhood. The mechanics of the election procedure and voting eligibility will be decided jointly by the neighborhood councils, the District, and the affected city. Where relocation is approved, it would be conducted in compliance with the Uniform Relocation and Assistance Act and State law. Where relocation is not approved, the plan will be changed to reflect a rehabilitation strategy.

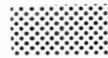
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Another method that will be considered is the creation of tenant-owned cooperatives. Units for low to moderate income families would be constructed with a subsidy from the Development District and turned over to residents who are trained to manage a cooperative. These cooperatives would provide residents with a form of homeownership and create a greater sense of concern for management and upkeep of the property. The subsidy must be sufficient so that this housing can be carried by the residents at a monthly cost which is comparable to current average rents. Equity should be limited so that normal turnover will not gradually result in pricing out lower income residents. Legal documents can be written so these units are returned to the Development District ownership if the experiment fails.

FIGURE 28 Displacement and Rehabilitation Areas



 Displacement  
 Rehabilitation

# Sand and Gravel

The sand and gravel industry is a major presence on the Salt River. According to the Arizona Rock Products Association, at least three quarters of the sand and gravel mined in Maricopa County comes out of the Salt River. Almost all of the sand and gravel mined there is used locally, primarily for construction.

Fifteen major sand and gravel operators on the Salt River were identified by the Arizona Rock Products Association as being within the Rio Salado Development District. There are another five or so smaller plants on the Salt River. Most of these sand and gravel companies produce ready mix concrete at their plants, and some also manufacture pre-stressed concrete products and asphaltic concrete.

According to the Arizona Department of Economic Security (DES), there are 13 firms and 150 employees involved solely in the extraction of sand and gravel in Maricopa County. But to obtain an accurate picture one must look

at statistics not only for mining and quarrying, but also for concrete products, which include ready-mixed concrete and asphaltic concrete products. There were 2,300 employees in the ready-mix category in Maricopa County in 1981, and 600 in the concrete products industry. The Department of Economic Security estimates that 95 percent of these employees work in the Rio Salado Development District.

Assuming that 95 percent of the above employees are in the Rio Salado Development District, there are an estimated 2,900 employees there, earning approximately \$60 million per year. To put this in some perspective, employment in the sand and gravel industry on the Salt River accounts for 0.46 percent of the total wage and salary employment in the County, and for 2.6 percent of the manufacturing employment. These figures may understate the importance of the sand and gravel industry. The construction industry, of course, is dependent upon these com-

**TABLE 12 Estimated Employment by the Sand and Gravel Industry in Maricopa County 1981**

<u>Category</u>	<u>Number of Employees</u>	<u>Payroll</u>
Mining and Quarrying	150	\$ 2,700,000
Ready-Mixed Concrete	2,300	\$48,200,000
Concrete Products	<u>600</u>	<u>\$11,000,000</u>
Totals	3,050	\$61,900,000

panies for materials. In this context, the sand and gravel operations are extremely important to the entire economy. Table 13 shows comparative employment in other categories.

Contrary to what many people think, sand and gravel deposits, like other natural resources, are limited. Depending upon demand from the construction industry, these

resources can be expended in a short period of time (50 years in a good location). Periodic flooding of the Salt River does not replenish the supply.

The fact that sand and gravel becomes depleted over time has implications for Rio Salado. The sand and gravel operators would like to mine out their reserves, which can be done in a manner compatible with a long term, phased development

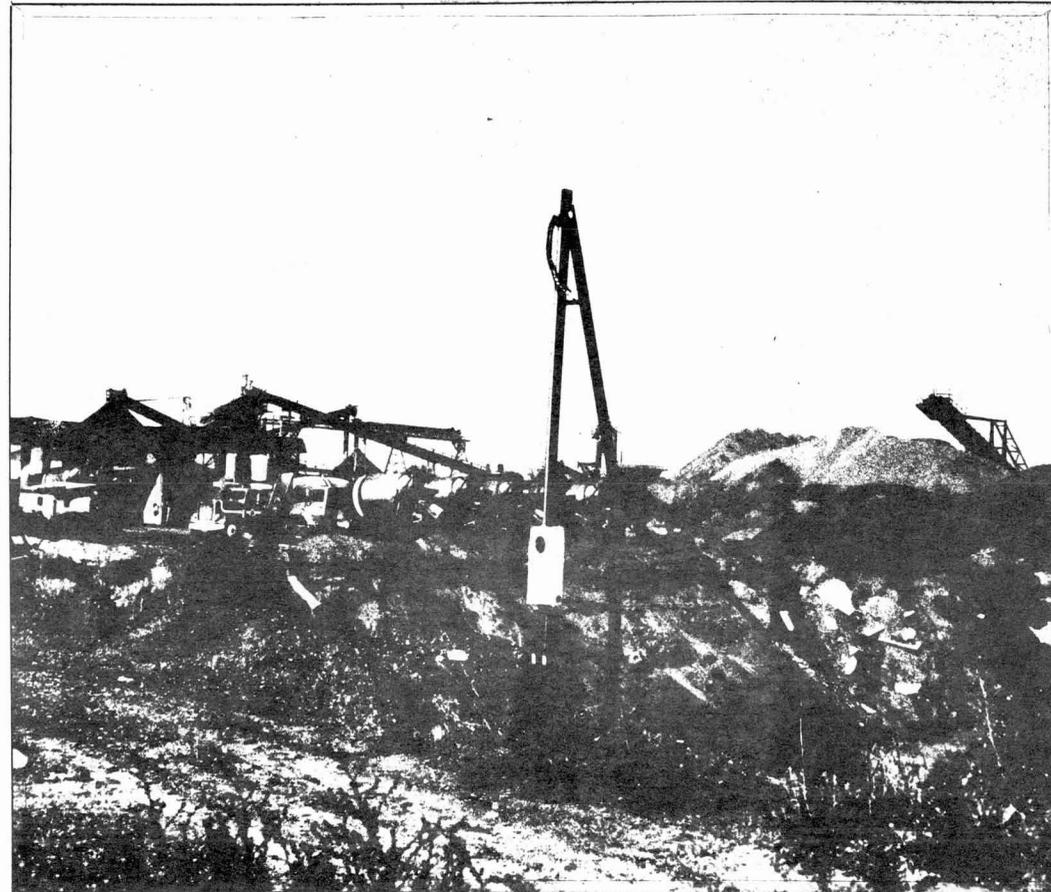
**TABLE 13 Maricopa County  
Employment by Category, 1981**

<u>Category</u>	<u>Employees</u>
Services	132,900
Retail, Wholesale	162,000
Manufacturing <sup>1/</sup>	116,400
Government	93,300
Construction	48,800
Finance, Insurance and Real Estate	46,300
Agriculture	21,600
Mining	400
Total	653,100

<sup>1/</sup> Includes 2,900 sand and gravel employees.

Source: Arizona Statistical Review.

**FIGURE 29 Sand and Gravel Operation**



plan. Sand and gravel operators are in favor of flood control, because the industry suffers economic losses as a result of flooding.

New reserves are constantly being sought. There are unmined reserves in both the Salt River Pima/Maricopa Indian Community and the Gila River Indian Community which offer future potential. Reserves are also available outside the District along the Agua Fria River. This means that this business could continue over a long period of time even as exhausted sites within the Rio Salado project are discontinued.

The major market for ready-mix concrete and concrete products is the construction industry. The impact of mining relocation is an increase in the cost of products, because of increased transportation costs, which in turn increases the cost of construction. Table 14 shows the relationship of concrete product costs to total costs of various construction projects.

**TABLE 14 Percent of Construction Costs Allotted to Concrete Products**

Type of Construction	Percent of Cost for Concrete
Industrial	10%
Commercial	7-8%
Residential	5-6%
Public Works	50-60%

The Rio Salado project proposes a gradual evolution of the mining operations into the land uses shown in the Master Plan. Portions of the affected areas have already been mined out, leaving empty pits. Other locations are still in operation and are projected to continue for a number of years. Thus, two basic approaches will be needed to transform the mined portions of the riverbed.

The first approach is one of reclamation and rehabilitation where the mining has been completed or is near completion. In some cases, substantial grading and reshaping of the land would be needed. Where possible, detailed Rio Salado plans and designs would be influenced by the existing situation.

A more desirable approach would be one of "progressive rehabilitation." This would be possible in areas not yet mined. A detailed plan for the orderly transformation of the area from mining to other uses would be prepared jointly with the sand and gravel companies. After agreement on the plan, the

mining would be conducted in accordance with these provisions. The result would be profitable mining of sand and gravel and concurrent creation of the land forms that would be needed for the ultimate development. Undesirable impacts on the surroundings - such as dust, noise and visual conflicts - would also be reduced. This would permit adjoining Rio Salado developments to occur prior to the exhaustion of the minable material.

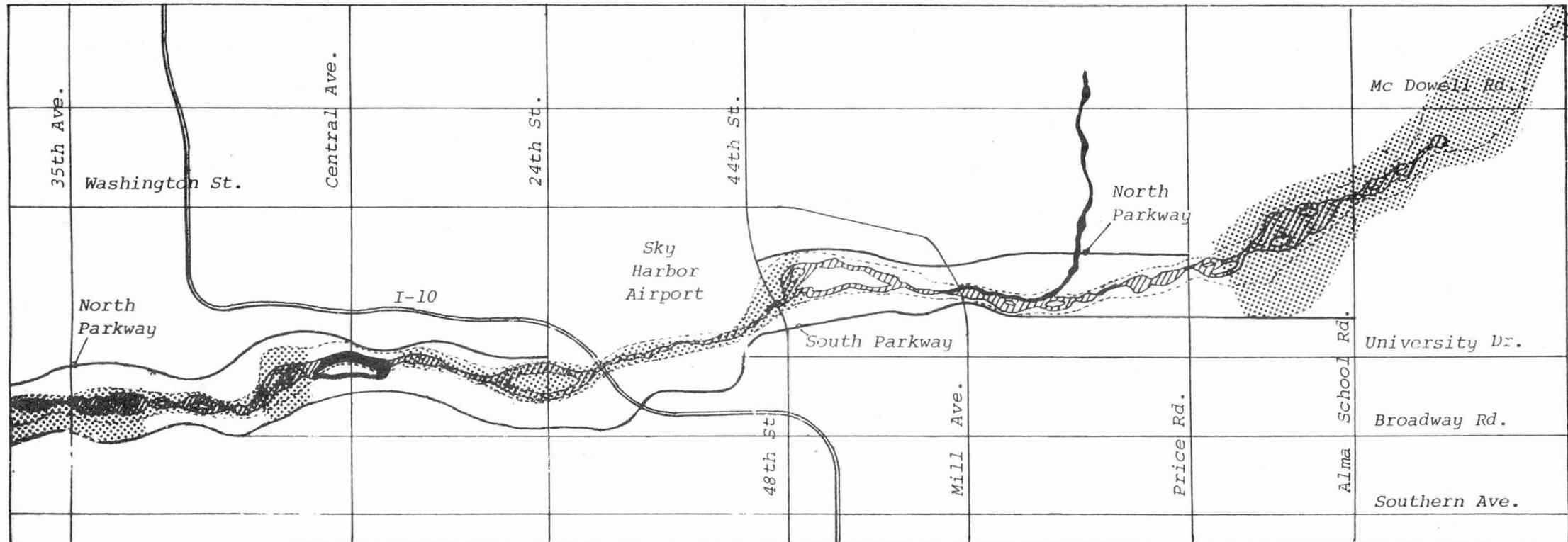
The phased transformation of the sand and gravel operations would occur over several years. Critical areas for early development will be on either side of Central Avenue in Phoenix and between Mill Avenue and Rural Road in Tempe. Of these two locations, mining occurs only at Central Avenue. The critical issue here will be the existing operation west of Central, which may have substantial remaining deposits.

Many operations in other locations are expected to continue for at least the first ten years

of the project. Major construction of the riverbed park area is scheduled to begin in year eleven. By this time, detailed plans and schedules would have been formulated for the relocation of the mining operations between Country Club and 43rd Avenue. Mining operations would then be relocated to other areas, including the riverbed east of Country Club and west of 43rd Avenue.

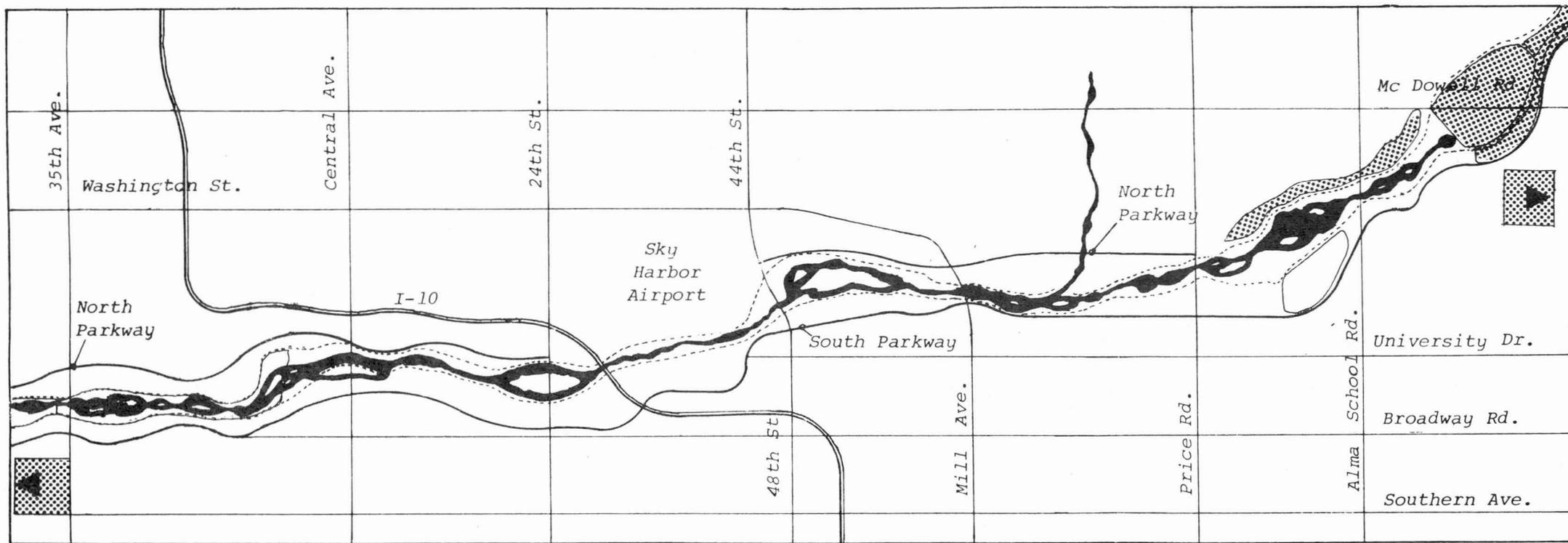
Given that much of the new development in the Phoenix area in the future will occur on the edges of the metropolitan area, the relocation of sand and gravel operations to locations upstream and downstream on the Salt River or even to the Agua Fria will place these firms in convenient and economical locations long into the future.

FIGURE 30 Sand and Gravel Mining - Years 1-10



 mining areas

FIGURE 31 Sand and Gravel Mining - Years 11-25



 mining areas

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# Transportation

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## ROADS

The plan proposes two new parkways parallel to the riverbed. This parkway system is shown in Fig. 32. The south parkway is continuous from 35th Avenue in Phoenix to Alma School Road in Mesa. On the north side, the parkway is interrupted by the airport between 24th Street and 44th Street in order to maintain the airport's "clear zone". It terminates in the east at the Price-Pima Freeway. If intense development extends to the east in the future and recreational uses of the Indian lakes build up, it may be useful to extend the north parkway to connect with the Beeline Highway. As development proceeds to the west beyond the first 25 years, both parkways would be continued in that direction.

Although the Phoenix metropolitan area is served by major arterials and a freeway system, access to the river edge is poor and continuous east-west movement along the Rio Salado

is impossible. The river is seen at the major crossings, but these give no direct access. Local streets are discontinuous and access to the riverbed is typically blocked by private businesses and storage yards.

The parkways are distinct from the existing street grid system and follow the curving flow lines of the riverbed. They are also located to skirt existing development and sometimes follow existing features such as canals. Linear traffic movements generated by the Rio Salado development will be accommodated by the parkways and will not interfere with traffic on local streets.

The city of Tempe has already begun the parkway system with its new road on the south edge of the existing riverbed. The City of Mesa has adopted an alignment for the Red Mountain Parkway along the south bank of the river. This parkway will intersect with the Price-Pima Freeway on the west and will extend into Apache Junction on the east. Some

details of these facilities will be determined by studies to be completed later. They will be included in a detailed Rio Salado Transportation Plan.

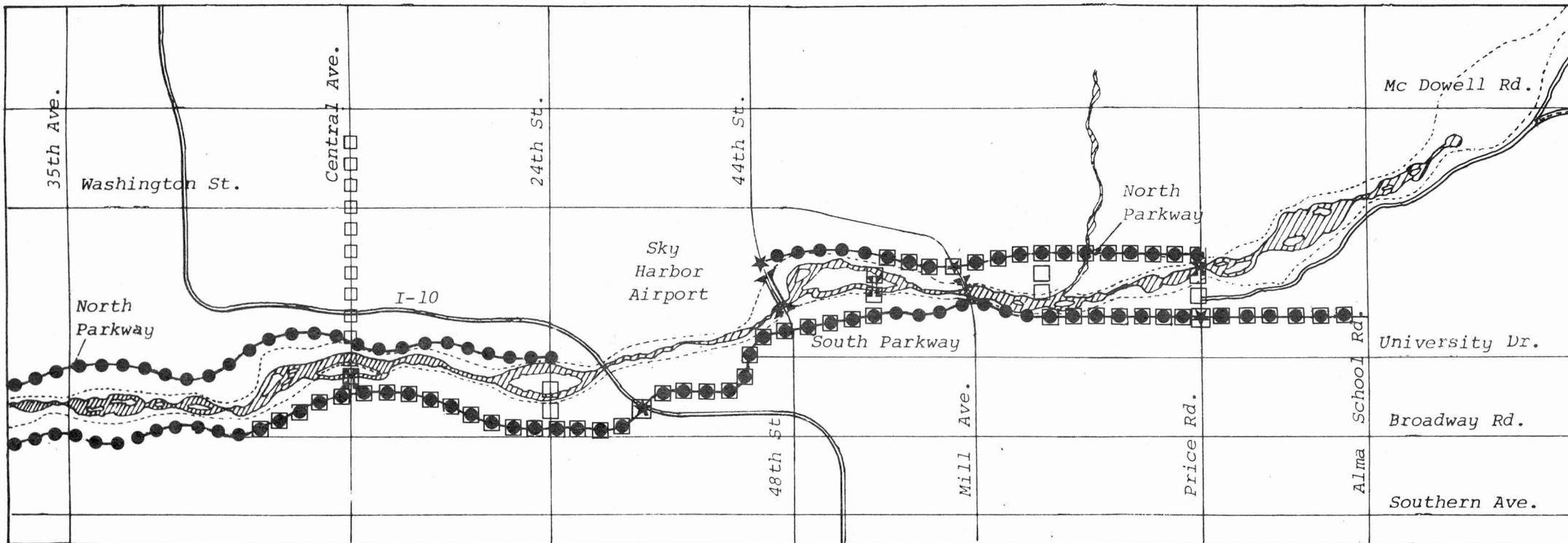
The Rio Salado Parkway intersects several major north-south roadways. These include the new Price-Pima Freeway, Mill Avenue, Hohokam Expressway, Central Avenue, 7th Avenue, and I-10. Most of these can be crossed at grade with the aid of traffic signals. Grade separations and ramps will be needed for some crossings, including the Price-Pima Freeway, I-10, and the Hohokam expressway.

The character of the parkway is illustrated in the section shown here (see Fig. 33). The roadway is four-lanes wide with an additional lane for emergencies. Entry to major development or activity areas will require turning lanes. In the center is a 12-foot wide planted median strip. The edges will be 20-foot wide landscaped strips where pull-off parking will be provided in places for bus stops or

viewing of the river in some places. Beyond these strips will generally be a 15-foot bicycle and pedestrian pathway at a slightly higher elevation than the roadway. This parkway cross-section may require adjustment in some places because of physical conditions and community preferences. Its design will require careful consideration in order to assure that it does not create a socioeconomic barrier between the Rio Salado development and the rest of the community.

There will also be an internal system of roads, trails and paths between the parkways and the edge of the riverbed. This system would be worked out during more detailed site planning, but should connect the riverbed with the general community and provide easy circulation within the parkways and along the river edge for bicyclists and pedestrians. Equestrian trails within the riverbed itself will permit riders to explore the wide variety of scenes and activities along the length of the park.

FIGURE 32 Transportation Elements



- new bridges
- parkways
- major intersections
- bus route
- central ave. shuttle

FIGURE 33 Typical Parkway Section

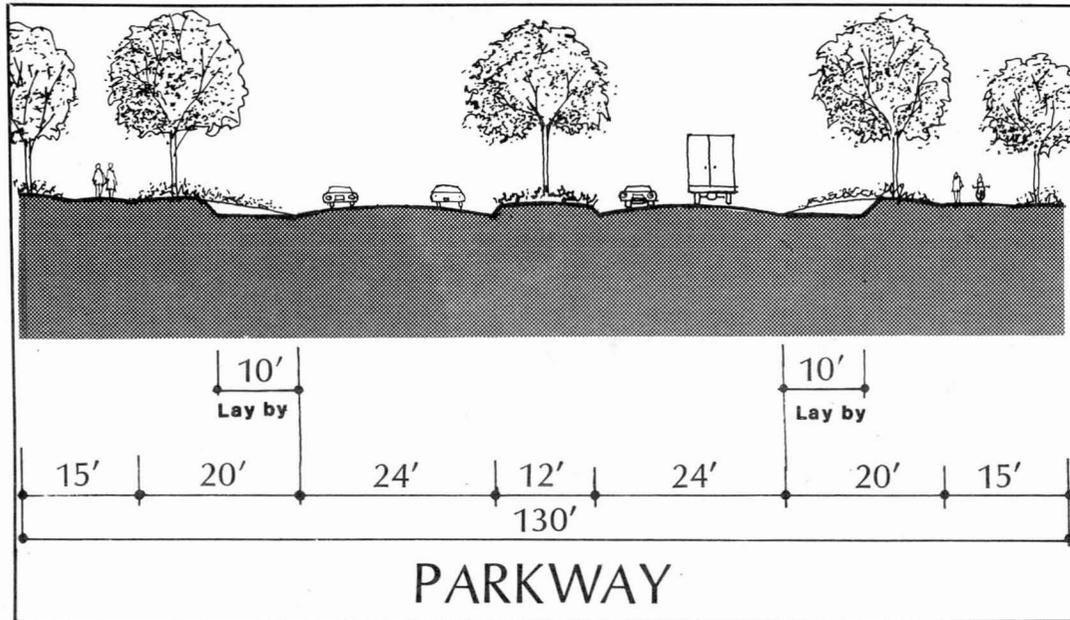


FIGURE 34 Existing Mill Avenue Crossings



### RIVER CROSSINGS

Several river crossings are presently congested. I-10 and Mill Avenue consistently carry heavy traffic loads and both experience serious daily backups during rush periods. A number of new bridges have been budgeted for construction over the

next five years. They are listed in the Appendix. In addition to those which are planned, others will be needed. The inadequate bridge capacity is particularly acute in Tempe. Although there are plans to construct new bridges at Hayden Road/McClintock Drive, and at the Hohokam Expressway, and to widen I-10 to eleven lanes south of the air-

port, additional crossings will be needed to provide good access to key development areas.

The plan proposes a new north bound bridge at Mill Avenue to parallel the existing one. This bridge replaces the at-grade river crossing now in operation (see Fig. 34). This road is sometimes closed and unusable due to flooding in the riverbed. The design of the new bridge at Mill Avenue should harmonize with the existing southbound structure. The new span may also provide a walkway for pedestrians, unless detailed structural studies of the old abandoned Ash Avenue bridge conclude that it can be restored for pedestrian use. This handsome bridge, seen in Fig. 35, is a historic landmark and there can be public parks on either end.

A new bridge in two segments is also shown at Priest Drive. This road is extremely important in opening up large new development potential just south of Papago Park and connecting it to other parts of Tempe, to emer-

gency services, and to the rest of the Rio Salado project on the south side of the river.

### ACCESS TO SPECIAL USES

A site for a new facility requiring excellent auto access and large parking areas - such as a State Fairground or domed stadium - is shown at 48th Street just south of the new parkway. This location is well served by I-10, 48th Street, 40th Street, and the new parkway. Heavy traffic for such a use would generally occur at off-peak hours on weekends or evenings, and thus at least should not interfere with business related traffic flows. Large parking areas would be tolerable here, given that the site is surrounded by industries and situated away from residential areas.

While either a stadium or fairground are shown as alternatives, there are some problems in putting a stadium here. Preliminary traffic studies indicate that 20-24 traffic lanes would be needed to carry 65,000 stadium patrons to and from the

FIGURE 35 Ash Avenue Bridge



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site within one hour, moving at 25 mph. Given proposed road capacities, even with the addition of the parkway and additional lanes on I-10, there is likely to be severe congestion which would slow freeway traffic to a crawl whenever games are held. Such a tie-up along the Hohokam and on I-10 would have consequences for the regional system, including the approach to the airport. The State Fairground is less likely to present any serious repercussions, as its patron flow is spread out over a period of days, and would require only seven traffic lanes in the area.

## MASS TRANSIT

To supplement private car transportation, a mini-bus system is proposed to connect areas of concentrated activity with each other and also with downtown Phoenix. An initial mini-bus shuttle would connect the cultural facilities on Central Avenue to downtown Phoenix, and begin with the opening of the exposition. The route between

downtown Phoenix and the Central Avenue Island should have a reduced fare to compensate for the short ride and to encourage greater use. As more development occurs in later years, another east-west route would be added to provide mass transit connections along the length of the Rio.

Such a service would enable a passenger to park near his home in southwest Phoenix, ride the bus from Phoenix to Price Road in Mesa, rent a canoe, boat downstream along the 12-13 mile stretch, walk back to the car and return home. The system would also provide residents along the Rio Salado access to shopping in Tempe, to the arboretum in Phoenix, or to work at some high-tech firm along the route.

This system will not eliminate the need for a car, but will reduce the need for new resident households to own more than one automobile. It has a potential of eliminating over 800 auto trips per day or over 2,000 vehicular miles per day. It therefore provides a savings

in fuel consumption and vehicle exhaust emissions.

Over time, as the extent and density of this new development increases, there may also be opportunities to install a more sophisticated mass transit system. This could take the form of a cable car, monorail or tramway. More study of these possibilities would need to be conducted in the future.

## DETAILED TRANSPORTATION PLAN

Following approval of the Master Plan and funding for the project, a detailed transportation plan will be needed in order to further define the circulation system. This plan will use the transportation element of the Master Plan as its beginning point. It will also rely on the results of continuing transportation studies being conducted by local jurisdictions. These local studies and plans will be incorporated into the Rio

Salado Transportation Plan, thus making the Rio Salado circulation system compatible with adopted regional and local plans.

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# Infrastructure and Services

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The full development of the Rio Salado will result in dramatic land-use changes, bringing 40,000 new residents into the District and more than 4,000 acres of new industries, offices, and other commercial uses over the next 25 years. Although this amount of development will require an increase in municipal services and infrastructure, these requirements will be relatively less taxing than if this same development were to happen on the periphery of these communities.

Generally, much of the infrastructure and many of the services are already in place and need only some upgrading. Some areas slated for new development between the parkways have not previously required utilities, which must therefore be extended from nearby mains in the arterial streets. Much land within the floodplain has no streets. The installation of utilities and new streets has been included in the overall site preparation costs.

## FIRE PROTECTION

Generally, there is good existing fire protection. This judgment is based on the standard that engine companies, which provide first response to an emergency, should have a service radius of one and one half miles and that ladder companies, which provide follow-up service with superior equipment, should have a maximum radius of two miles.

In Phoenix, in the Central Avenue area where initial development is encouraged, the coverage is strong. To the west, however, between 27th and 19th Avenues, new stations will be required to provide adequate service as new low density residential development occurs.

Engine Company 23 should be maintained at its current location and a new Company 38 at 40th Street and Broadway should be established, as shown in Fig. 36. This change will provide the appropriate level of protection to the new fairground and industry around it.

In Tempe, the areas which will need additional coverage are on the south side of the river, along University Drive between 48th Street and Hardy, and around the intersection of University Drive and Price Road. These areas fall outside the existing service radius of the station located at University Drive and Rural Road and are proposed for industrial and high density residential development. Another problem area will be north of the river along the extended Priest Drive, where significant new mixed use developments are also planned.

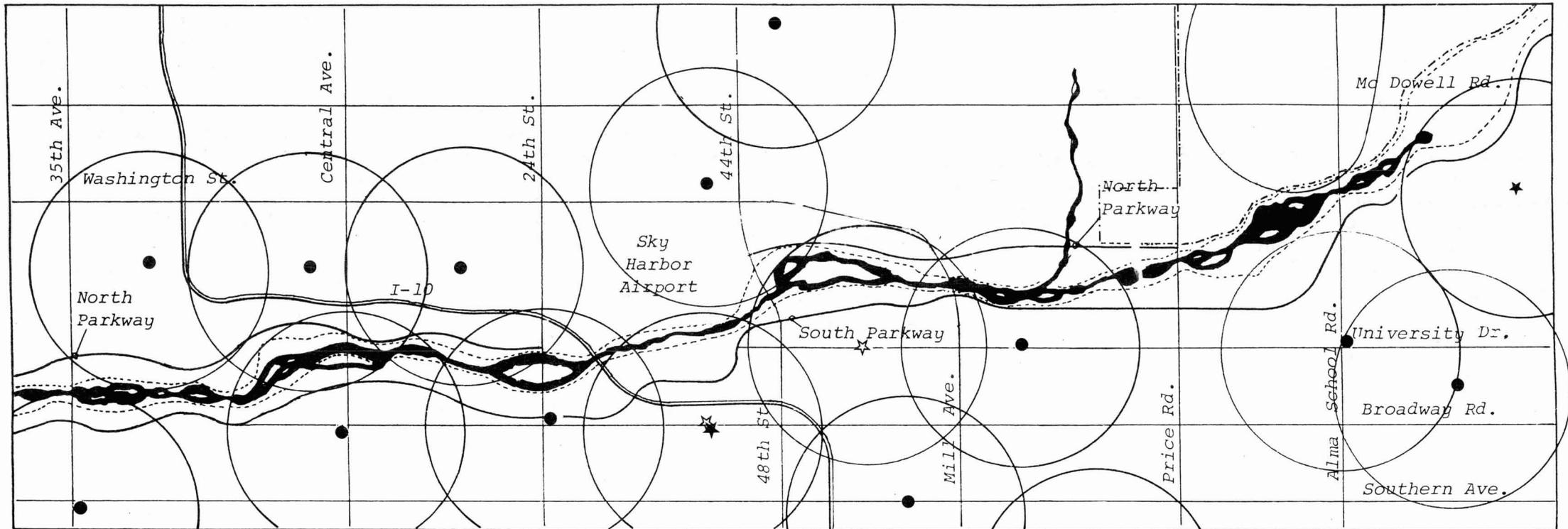
We propose the construction of one new fire station to be located at University Drive and Priest Drive. This new station provides a remedy for at least two of the problem areas. Unfortunately, there is no good solution to the weak area at University Drive and Price Road without making the costly move of an existing station. Access to this new development from existing stations, however, will be improved somewhat by the new Rio Salado Parkway.

The City of Mesa will be fairly well served by two facilities, one existing and one proposed. A proposed industrial area on Price Road is the only intensive use which will be outside the service radius of a station but, again, the new Rio Salado Parkway should be effective in improving access to this area.

## POLICE PROTECTION

There are no generally accepted standards for police station coverage, since police response does not ordinarily originate from a facility, but from mobile units which are widely scattered. The addition of a small substation within the Rio Salado primary area, while not necessarily a significant factor in crime prevention, may help to provide new businesses and residents with some psychological reassurance. Major events at the Fairgrounds or Stadium site will also require a shift in manpower to handle the significant public protection and traffic control problems which will result.

FIGURE 36 Fire Protection



- service radius
- existing stations
- ☆ stations recommended by CLA
- ★ stations proposed by city

Except for an expected increase in patrol units, no problems are evident in Tempe or Mesa. In fact, the Rio Salado Parkway will improve upon the response time possible in Tempe north of the river.

The riverbed park and special facilities along the banks will most certainly require some level of special policing as is common to all large park facilities in urban settings. Park rangers or guides should be included in the park's maintenance and management structure.

### SOLID WASTE

The cities of Phoenix, Tempe, and Mesa will need to plan for the collection and disposal of solid waste for the proposed 40,000 new residents of the District. Industries and commercial uses can be required to handle their own trash and garbage through private refuse disposal companies. New residents will produce solid waste on an annual basis as shown in Table 15. These

yearly totals are equivalent to two acres of landfill in Phoenix and one half an acre between Tempe and Mesa. This is based on a depth of six feet, which is standard municipal practice.

The City of Phoenix is currently trying to locate a new landfill site to serve the south and west areas of the City, which will include the Rio Salado community. This new landfill is planned to be situated well away from the river and should present no further environmental problems to the residents of the project area. Tempe and Mesa also appear to have the capacity to accommodate this additional load.

### SEWAGE DISPOSAL

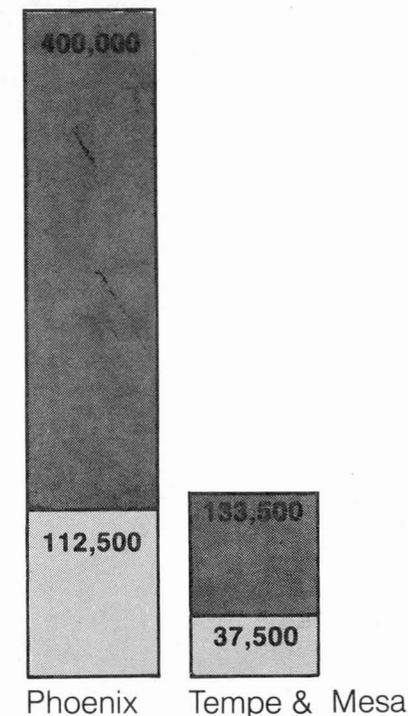
Sewage originating in the Rio Salado Development District will be from three sources: residences, commerce and industry. The amount and type of sewage from residential and commercial uses is fairly predictable. Industrial wastes,

**TABLE 15 Projected Solid Waste**

(cubic feet)

	<u>Phoenix</u>	<u>Tempe &amp; Mesa</u>
Garbage	112,500	37,500
Rubbish	<u>400,000</u>	<u>133,500</u>
Totals	512,500	171,000

Rubbish   
Garbage 



on the other hand, are completely dependent on the type of industry. This plan does not encourage industries which will be water intensive or which will produce sewage contaminated with large amounts of

grease, chemicals, and non-organic ingredients, making the treatment process more difficult and costly. Volumes shown in Table 16, therefore, assume normal conditions when Phase II development is achieved.

TABLE 16 New Sewage

(gallons per day)

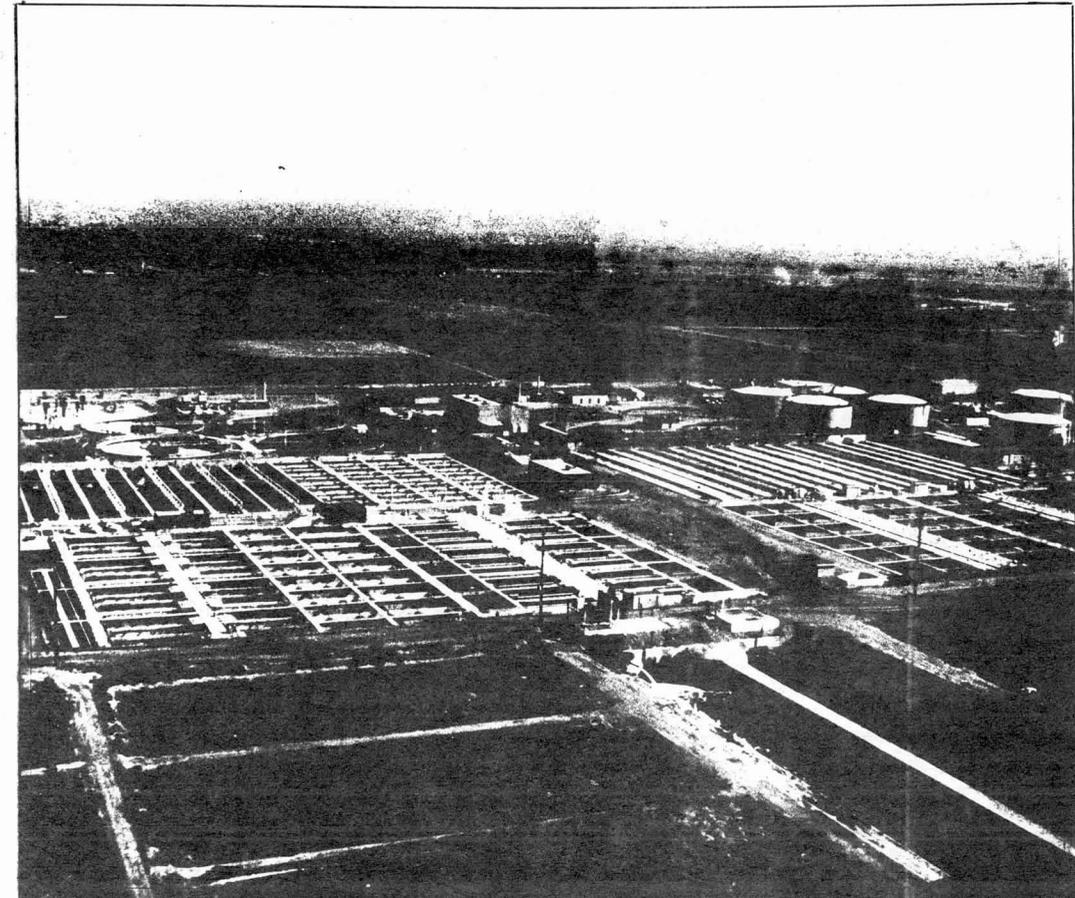
	<u>Phoenix</u>	<u>Tempe</u>	<u>Mesa</u>
Residential	4,500,000	1,500,000	750,000
Commercial	10,000,000	1,300,000	150,000
Industrial	10,000,000	4,000,000	500,000
Totals	24,500,000	6,800,000	1,400,000

New sewage produced in the Phoenix and Tempe portions of the district will be substantial but manageable. The 91st Avenue Wastewater Treatment Plant addition is now under construction. This expansion will accommodate an additional 30 million gallons per day.

Mesa, with its Dobson Road plant and a proposed new plant at Falcon Field, will also have the ability to handle the projected sewage. Mesa has considered closing the Dobson Road facility, however. We recom-

mend against this closure, since it would be detrimental not only to handling sewage from Rio Salado development, but also to the project's need for effluent from this plant to fill the lakes and streams in the eastern end of the development area. This need is documented in the section on water availability. The conversion of this facility to a package plant would be an acceptable alternative since this process would also generate the effluent needed for the waterbodies.

FIGURE 37 91st Avenue Waste Water Treatment Plant



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Very little new sewage will result at the Salt River Pima-Maricopa Indian Community. Each major user in this community must now develop individual treatment methods for its own use. As new development occurs beyond 25 years, it may become necessary to pump sewage upstream for treatment in Tempe or Mesa. However, this will not be necessary for some time.

Finally, the management of all sewage which will result from the Rio Salado Development District will be determined in the normal updating of the Regional Wastewater Treatment Plan. It is likely that future regional plans will recommend the development of a series of small package plants, like the one suggested here for the City of Mesa, as a method of handling increased volumes of sewage over time.

## STORM DRAINAGE

Approximately 9,000 acre-feet of urban storm water is discharged into the Rio Salado each year. The details of this water flow have already been presented in the Flood Management section of this report.

The plan accommodates these run-offs either by adding them to the lake system or by diverting them to the low flow grass channel. Although this water is also polluted, most typically with asbestos from rubber tires, it can be made safe by dilution in large water bodies.

New development in the Rio will not significantly increase this flow. In fact, discharge from the immediate area is likely to decrease slightly due to city requirements for the development of drainage ditches and retention basins in new construction.

## OTHER UTILITIES AND SERVICES

Some large utility lines are currently located within or near the riverbed. Local gas, electricity, water delivery and telephone service will need to be created to facilitate new development. For the most part, the provision of these services will require a simple tie-in to the large service lines mentioned above. The cost of providing these utilities has been included within routine site preparation estimates located in the Appendix. Only the relocation of electric power lines, described in greater detail in the next section, will require any complex and costly action.

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# Environment

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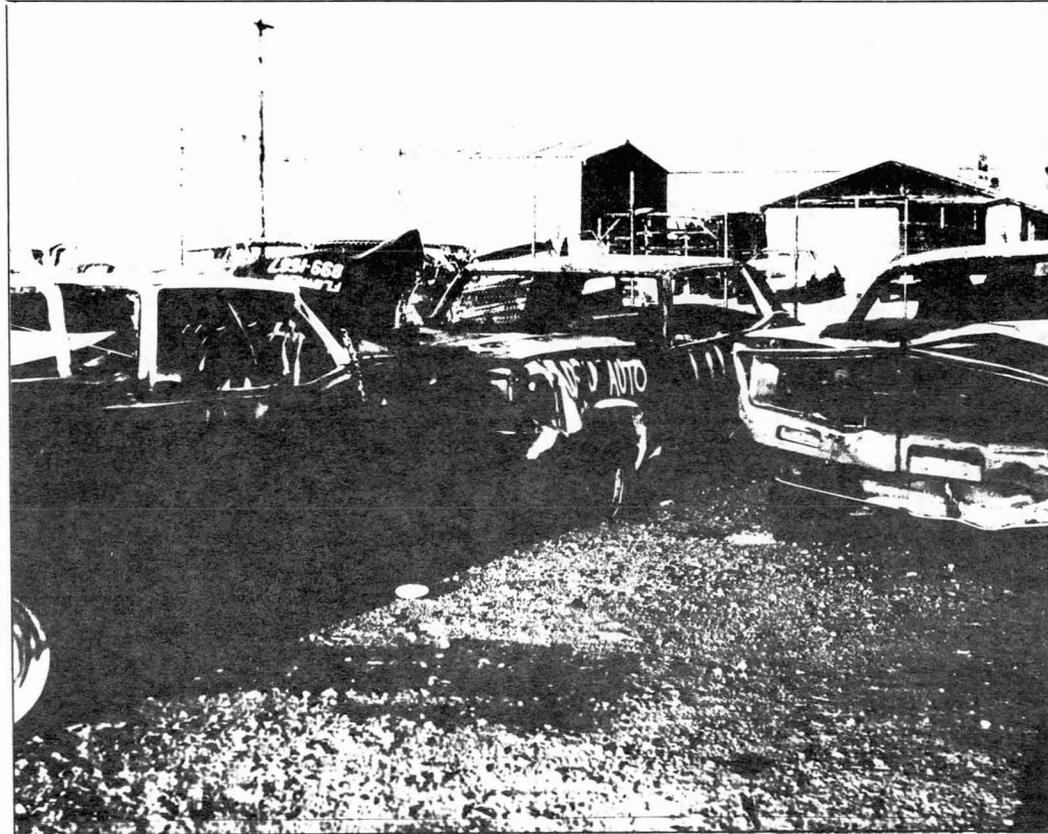
The dry riverbed and flood plain have traditionally been viewed as a wasteland and dumping ground for uses unwanted elsewhere. These include sewage treatment plants, high power electric transmission lines, landfills and illegal dumps, junk yards and open storage. The local environment is characterized by air pollution and airplane noise. The plan eliminates some of these problems, even turning them into assets, while others can only be mitigated or worked around. There are also some positive aspects, such as the extensive Indian ruins, which should be conserved. The substantial sand and gravel industry is described in its own section of the plan.

## IMPROVEMENTS

### Ecology

The reclamation and development of the Rio Salado will dramatically improve the ecology of the river cor-

FIGURE 38 Typical Junkyard



ridor. A barren, dusty, chaotic area will be transformed into a green and orderly landscape, with favorable habitats for many varieties of plant and animal

life not presently found there. Although the park design will emphasize native plants, there will be special protected areas in which more exotic materials will flour-

ish. For example, the proposed desert park arboretum will include low water plants from around the world. As this new plant cover develops, animal life will move in from surrounding desert.

### Air Quality

Air quality in the area is currently affected by wind-blown dust. This problem will be reduced through the coverage of the barren lands by plants or urban development.

Although the plan shows an increase in industrial development, these are projected to be clean, light industries that do not generate air pollution.

Air in the Phoenix area is recognized for its low humidity content. This is extremely important in the summer months when temperatures consistently rise above 100 degrees. The new water surfaces and irrigation proposed in this plan will not change the humidity levels in the District to any

measurable degree. Water bodies are designed to have good flow movements to prevent stagnation and foul odors.

Traffic in the area will increase and so will the levels of auto emissions, but a more detailed study would be needed to determine more precisely the levels of air contaminants that could be expected. The creation of a shuttle bus system and the encouraged use of bicycling or walking to and from work are features which are aimed at keeping the air quality as high as possible despite the expected increases of population and employees.

#### Reuse of Landfills

There are numerous landfills and dumping sites along the Rio, some of which are still active. Several of the closed sites can be made usable and attractive by building parks and golf courses on them. The City of Phoenix has already begun to demonstrate this at the site between 7th and 16th Streets, on which a new park

**FIGURE 39 Illegal Dumping**



has been built and a golf course is planned.

Some of these landfills have been cited for hazardous meth-

ane gas buildups. Local officials are currently in the process of installing proper venting and monitoring devices at these locations. The 19th

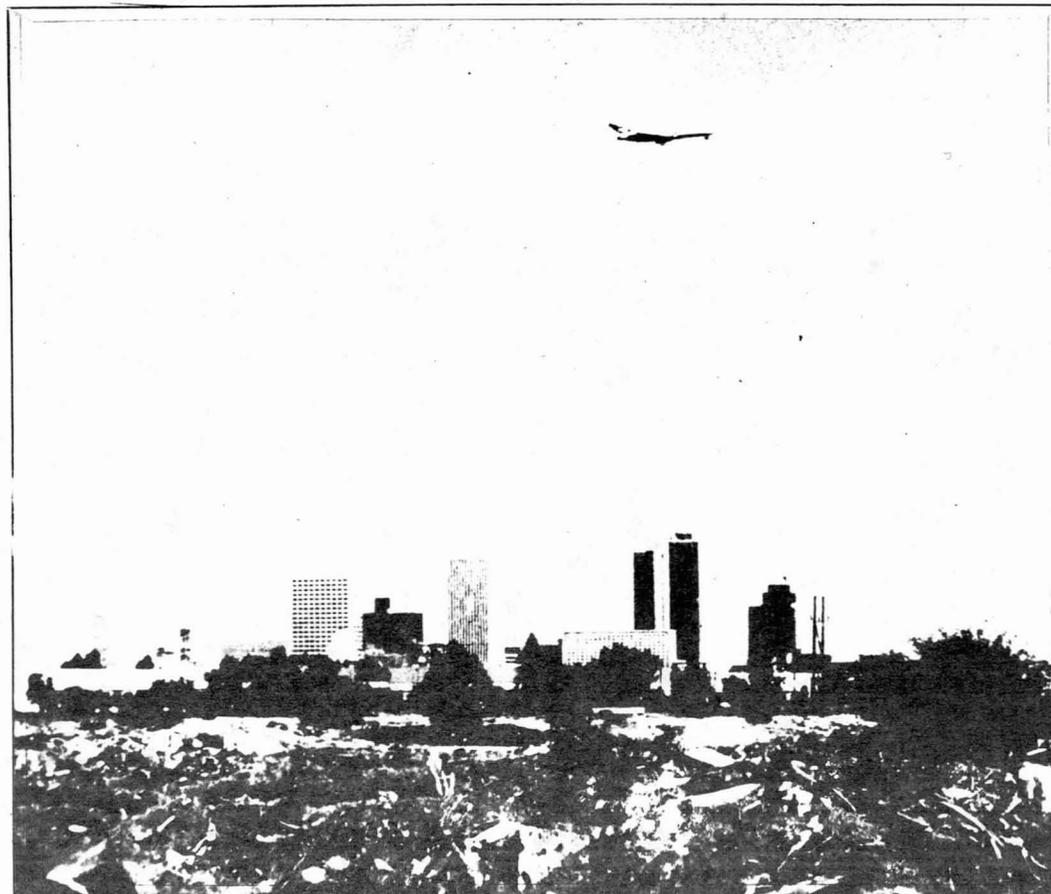
Avenue landfill in Phoenix, has recently been listed by the Environmental Protection Agency as one of the nation's 300 most dangerous toxic waste dumps. The plan shows this landfill becoming part of a large desert park and arboretum, a central feature in the strategy of opening development to the west. It is possible that this landfill will need to be removed before the park can be built. This must be analyzed during initial implementation. Indeed, all landfills must be tested for hazardous waste before the proposed development can proceed.

The landfills are also causing contamination of the groundwater along the Rio. This occurs when the decomposed material in the landfill mixes with flood water, creating a toxic leachate. This substance then seeps into the groundwater and contaminates it. As explained earlier, pumping groundwater away from these landfills for use in creating lakes will substantially reduce this problem.

This polluted water will be diluted by mixing it with treated effluent so as to make it safe for body contact, assuming there are no seriously toxic substances present. Lake bottoms will be lined to prevent re-seepage into the groundwater.

A major investigation of the landfills will be necessary before the proposed development can occur. This investigation will involve several governmental agencies. A technical committee will be formed to conduct and monitor this work within twelve months after legislative approval of a permanent financing plan. The Rio Salado Development District, in conjunction with the responsible agencies, will complete an investigation of the potential impacts of existing landfills within the area covered by the plan. This study will encompass the compilation and evaluation of existing data; a description and analysis of existing monitoring and regulatory efforts; and the identification of a strategy,

FIGURE 40 Airplane Noise



including estimated costs, for solving the environmental problems caused by the landfills. Following completion

of the study, any needed adjustments will be made to the plan. Future detailed plans will be prepared in a manner

consistent with the results of the study.

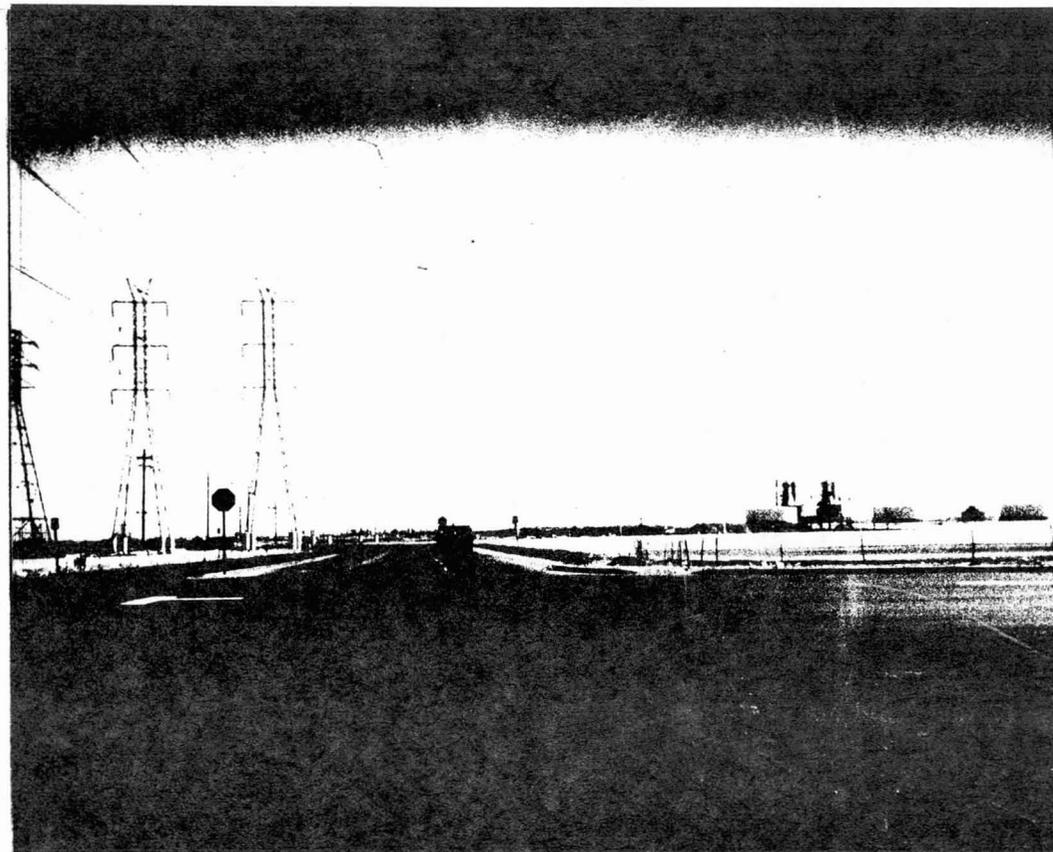
## MITIGATION

### Noise

The impact of noise from Sky Harbor Airport will be significant over a large portion of the Rio Salado area. A technical memorandum associated with the Sky Harbor Master Plan identifies the areas that are presently affected and projects their location into the future. These contours have been used as the basis for proposed Rio Salado developments that are compatible with accepted noise standards. The projected Ldn 65 contour lines for 1990 and 2000 are shown on the master plan map (see Figure 5). While it is impossible because of changing flight patterns and technologies to predict just how the planned additional general aviation runway will alter this contour, we believe that it will expand southward just below the airport, from 24th to 40th Streets.

Timing of development to coincide with the projected noise patterns is important. Development in some locations cannot occur until the noise impacts are reduced as projected by the airport plan. Some residential developments that are on the fringe of the Ldn 65 line will require more detailed evaluation before construction. This is true, for example, in Tempe from Mill Avenue to Indian Bend Wash, and 24th Street in Phoenix. Such an evaluation might dictate that noise reduction materials be used to reduce the sound levels within the residential areas. The revitalization of a neighborhood within the Ldn 65 zone on the northside of the river between 12th and 16th Streets is also shown. This neighborhood is sizeable. Its relocation could result in serious social and physical disruption. However, residents of the area have expressed an interest in discussing possible relocation by the Rio Salado District if its effects could be made positive. Such an action would solve the noise problem

FIGURE 41 Existing Power Lines



for these residents. If the ultimate decision is made to maintain the neighborhood, however, any new infill housing should be designed to

insulate its occupants from the noise.

Other noise generators are the railway and I-10. As with the

airport, these uses are permanent and so new development has been made compatible with them. Housing has been kept away from the freeway by at least 1,000 feet and from the rail line by at least 300 feet.

#### Odors

Odors are present in those areas which are near the sewage treatment plants. These odors come from the open drying beds of sludge, a necessary step in the treatment process. In order that the development potential in the western end of the Rio can be realized, we recommend the relocation of the drying beds at the 91st Avenue sewage treatment plant to its west side so that housing to the south will not be downwind from this noxious smell.

#### Power Lines

Electricity for this portion of the regional area is transmitted through high power lines which run along much of the length of the riverbed east of Central

FIGURE 42 Existing Power Line Alignments

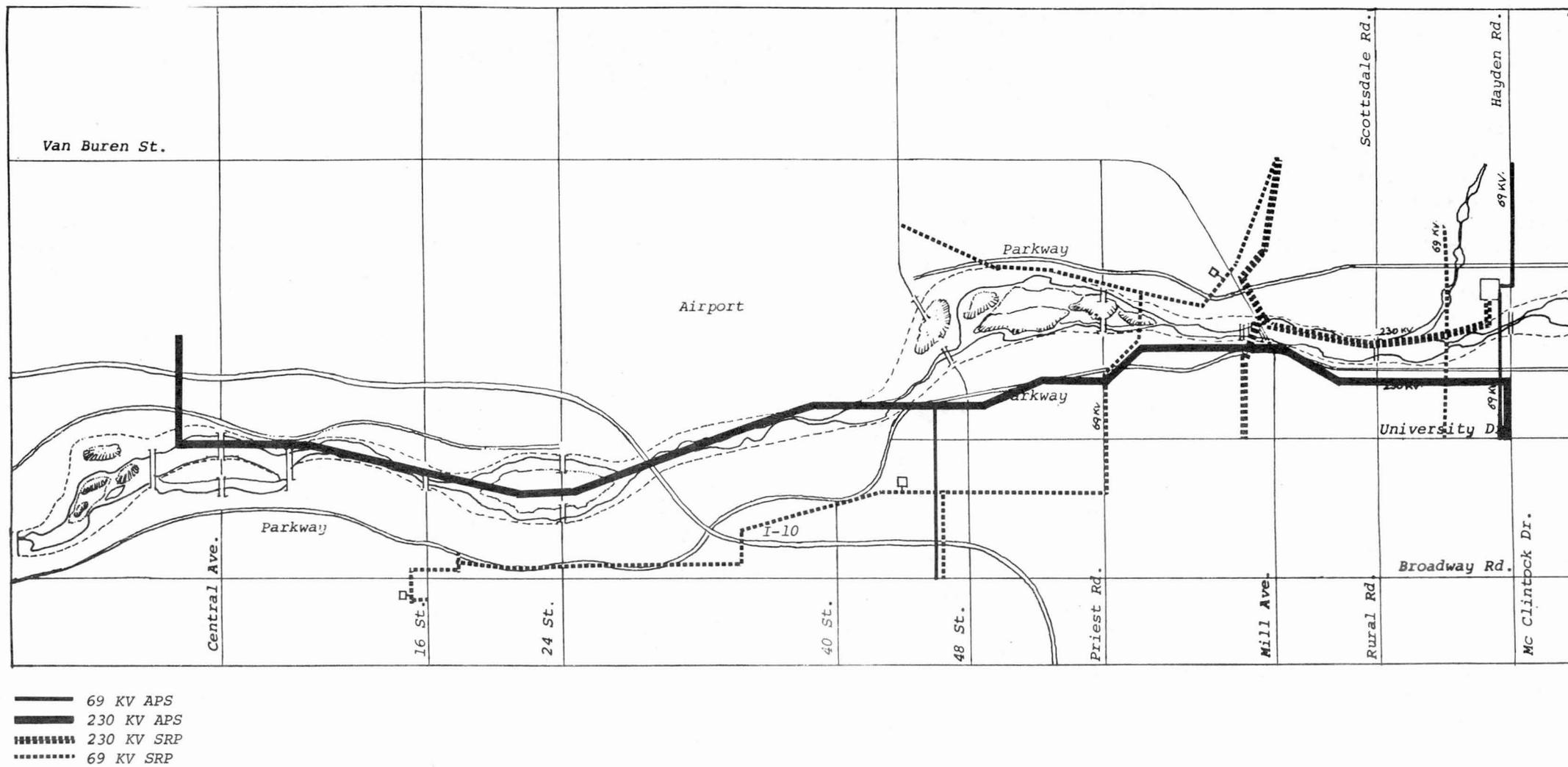
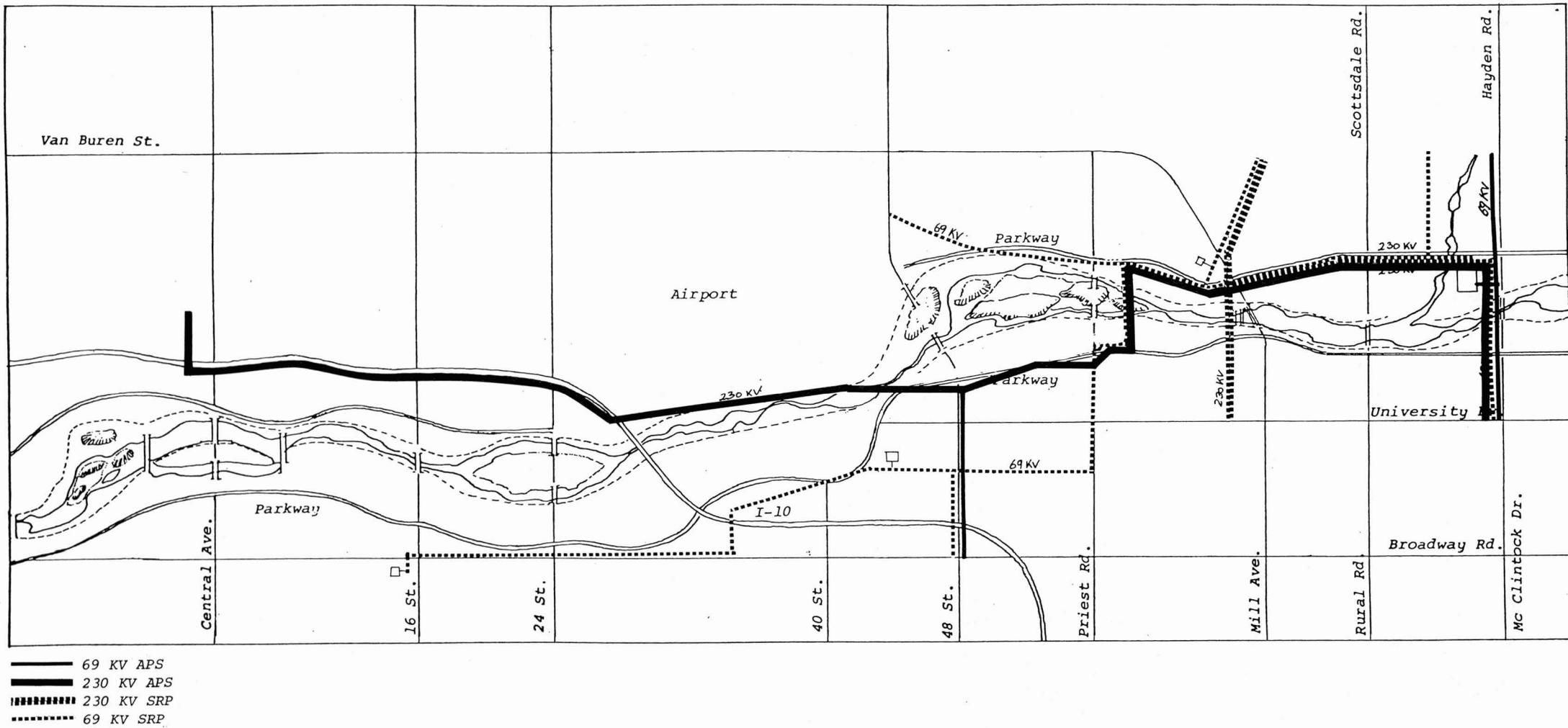


FIGURE 43 Proposed Powerline Alignments



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Avenue. These old style, massive lattice-style towers, and the power cables connected to them, limit development of the riverbed because activity beneath them is not advisable, and sometimes not permitted. Ideally, such lines should be placed underground, but the cost is substantial.

It is proposed that existing towers be replaced by lower, more modern steel mono-tube poles located from 400' to 1,000' apart. These lines would also be realigned to keep them away from structures and places slated for intense recreation use. The relocated lines will appear along the north and south bank of the Rio and will involve about twenty miles of new poles.

Realignment will, of course, conform with numerous local, state, and federal regulations regarding minimum clearances between or lines and uses such as housing, lakes, airplane flight paths, etc. Both the existing and proposed alignments are illustrated here in Figures 42 and 43.

## CONSERVATION

### Water

This plan shows how one can create a rich green landscape using moderate amounts of treated sewage effluent mixed with groundwater, which might otherwise be wasted because it is too saline for drinking or irrigation. Drought resistant plants, which use little water, are native to the desert and will impart a special and appropriate character for the park and adjacent development. Wherever there is running water, as in the rapids between lakes, it is recycled. Some lakes are used as groundwater recharge basins. The narrow braided forms of the water bodies create a maximum of usable shoreline for any given area of surface evaporation.

### Land

The conservation of land is also an important aspect of this plan. The development of this centrally located area at

higher densities is more efficient than continued low density growth at the periphery of the metropolitan area. Housing between 19th Avenue in Phoenix and Price Road in Mesa will average fifteen units per acre, with even higher densities at key locations. This project, therefore, will help to encourage urban infill.

### Energy

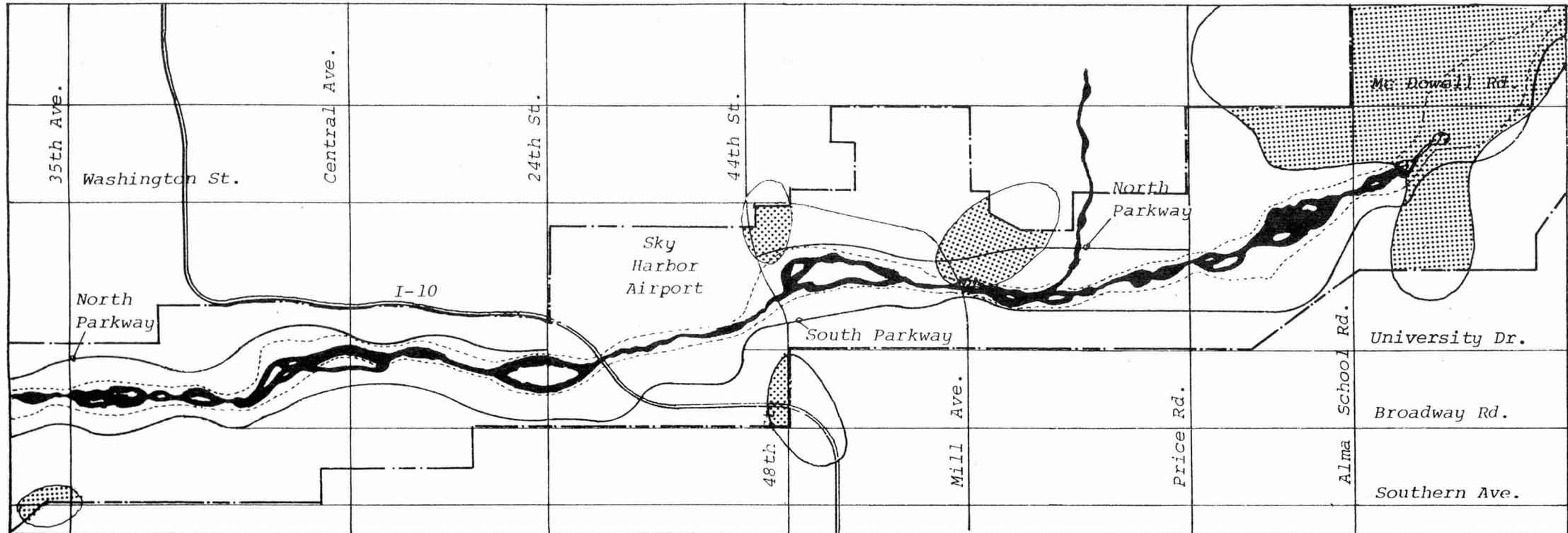
The plan also conserves energy resources. A large new employment base will be created near the center of the region, reducing overall travel time and conserving fuel. The great park also reduces the need to travel long distances for recreational opportunities. The plan shows how work places, housing and commerce can be developed in a fine grain mix to reduce dependence on the automobile.

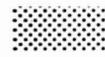
### History

Archaeological sites dating from the early period of Indian settlement are located in the floodplain from Price Road go-

ing eastward, from Mill Avenue to Scottsdale Road on the north bank, and from 40th-48th Street at Buckeye Road (see Fig. 44). Detailed examinations must be conducted before any actions can be taken in these areas. If such examinations reveal significant archaeological finds, beyond what is now known, the plan may require adjustments in both public and private development areas. For example, the plan shows lakes in the Price Road area. A specific find would influence the shape and size of the lakes. This plan, however, has avoided proposing major new developments at the known locations. The plan either preserves these areas in a natural state or proposes parks or other uses compatible with ruins. The Pueblo Grande ruins between 40th and 48th Streets, for instance, have been protected, and a new park which runs between the pueblo and the river, preserves the traces of the Indian canal system.

FIGURE 44 Archaeological Sites



 Archaeological sites

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## RESEARCH AND EDUCATION

Nearly every aspect of the present and future environment of the Rio Salado offers opportunity for research, demonstration, and education. Such a program should be an integral part of the plan.

### Research

Research must be conducted on water quality at each landfill site to determine the degree to which groundwater must be treated or diluted for use in the lake or irrigation system. Each landfill must also be tested for toxic substances to determine whether or not they must be removed prior to re-use as parks or golf courses. Research at the several points along the Rio which have archaeological significance must be conducted to determine where development can occur without disturbing key sites.

Other research may open up new approaches. One project might test alternative fuels or engine types to power the mini-

bus system at low emissions levels. The desert park and arboretum may test drought resistant plants for their tolerance of urban conditions, which could open up new options for local use. Opportunities also exist here to explore techniques for buffering areas and structures from airplane noise. This research will be particularly important in making existing residential neighborhoods more livable along the north edge of the river.

### Demonstration

Implicit in most of the research projects mentioned above are opportunities to publicly demonstrate good management of the environment. Less polluting shuttle bus engines and fuels, the conversion and use of polluted groundwater form around landfills, methods of cleaning up toxic substances at landfills to be re-used for public recreation, excavating and preserving Indian ruins and artifacts, and noise buffering techniques may all prove useful elsewhere in the region.

The project as a whole is a demonstration of the proper use of water in an arid land, illustrating how to achieve maximum impact with moderate quantities and how to recharge precious groundwater with treated sewage effluent. The appropriate use of plants in an urbanized desert setting can be an important demonstration, not only for local people but also as an inspiration for people in other parts of the world where water is scarce.

Showing how a balanced and mixed community of housing, industry and offices can be successfully designed and operated, can help in rethinking the zoning regulations which dictate separation of these uses. A large scale successful demonstration of tenant owned and operated limited equity housing cooperatives could stimulate a shift in national policy with regard to housing for low and moderate income individuals. An anti-displacement program planned as part of a large development project will be a highly significant innovation and model for

others.

### Education

The research and demonstration activities outlined here must be well publicized so as to increase their educational value. Local citizens can learn new ways of doing things. The Rio Salado could become a laboratory for visits and tours by school groups, professional organizations, and city administrators from all over the world. The Desert Park Arboretum, the Water Museum, and Discovery Place will be focal points for disseminating information about the techniques and innovations in managing the environment which will be used here.

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# **COSTS AND BENEFITS**

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# Economic Impacts

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This section evaluates the economic impacts of the plan on the District and on the region. The economic impacts evaluated include the following:

- o New development
- o Property values and Tax Revenue
- o Employment impacts
- o Flood plain
- o Upstream flood control
- o Regional efficiency
- o Regional growth
- o Recreational user benefits
- o Tourism
- o Population and housing

In assessing the impacts of future development alternatives, the following aspects have been taken into consideration whenever possible:

1. The magnitude of the impact. What is the anticipated change in impact?
2. The incidence of the impact. Who is affected by this change?

3. The significance of the impact. Given the magnitude of the change and its incidence, how important is it? A determination of the significance of an impact requires a value judgment as to whether the change and its effects are significant and acceptable.

## NEW DEVELOPMENT

We have examined the impact of large water-related amenities on land use and development patterns in six communities: Town Lake in Austin, Texas; the Charles River Basin in Boston and Cambridge, Massachusetts; the Lake Michigan shoreline in Chicago; the Turtle Creek Area in Dallas; the Riverwalk in San Antonio, Texas; and Mission Bay in San Diego. Detailed descriptions of these projects are included in Appendix B of this report.

The findings can be summarized as follows:

1. The predominant type of

development attracted to the private parcels adjacent to a major public amenity is residential, as long as residential use is compatible with existing land use. In areas such as San Antonio where the amenity occurs in an already developed commercial area, intense commercial development also occurs.

2. Over time, the density of development increases as land values and market demand materialize or increase. Sales prices or rental rates are demonstrably higher. Thus, the assessed valuation per unit of land area is also demonstrably greater.
3. The zone of influence in which the increase in density and value of development occurs is sometimes very narrow. On Lakeshore Drive in Chicago, for example, it extends only to the blockfront immediately to the west.
4. The time for development of

areas adjacent to such amenities can be very long -- the projects discussed here are still in the process of development, 20 and 50 years after initiation.

In relating these findings to Rio Salado, several things must be taken into account. First, the size of the Rio Salado Development District dwarfs most of the previously mentioned projects. The sheer size and scale of Rio Salado affect the magnitude of its impacts and the types of development that will occur there. Adjacent uses will not just be residential, but will be a mix of uses. Also the presence of the airport, sewage treatment plants and the like restrict the types of development which can occur in some areas of Rio Salado.

The levels of potential new development within the Rio Salado Development District reflect both regional market conditions and the elements of the plan. The amounts and types of private development likely to occur have been de-

terminated, taking into consideration the absorption rates and market issues, which are presented in the Appendix.

The amounts of private development expected to occur in planned areas have already been described in the New Development section. These absorption potentials are guidelines for planning purposes, and actual absorption should fall within this range. These amounts shown do not necessarily reach the maximum market potential, since physical design and planning issues have also been taken into account in making these plans. This difference is shown here in Table 17. The excess demand may still occur within the District boundaries, but outside the planned areas within the parkways.

## PROPERTY VALUES AND PROPERTY TAX REVENUES

Except for land which lies within the riverbed (average value \$20,000 per acre), the current average market value of

land in the flood plain of the Salt River is \$40,000 per acre. This compares to average metropolitan area market values for prime developable land as follows: \$160,000 per acre for prime industrial land and \$200,000 per acre for prime commercial land. Thus, rescuing land from the flood plain for development could increase property values of such land by 4 to 5 times.

Property tax revenue increases from development within the District in the next 25 years have been projected based on the acreage projections by use for each phase, and on estimated annual increase in the value of adjacent property within the District. In estimating property tax revenues, a prior report prepared by a Task Force formed to study the economic impacts of upstream flood control, entitled Rio Salado and Plan Six Development Projects was relied upon. This report quantified increased property tax revenues generated by the development around four hypothetical lakes created after upstream flood control. The

**TABLE 17 Market Absorption of Land Versus Development Shown in the Plan**

(acres rounded off)

<u>Use</u>	<u>Range of Absorption Potential</u>	<u>Development Shown in the Plan</u>
Low Density Residential <sup>1/</sup>	1,050-1,350	1,135
High Density Residential <sup>2/</sup>	800-1,050	693 <sup>3/</sup>
Light Industrial	1,200-1,600	1,573 <sup>4/</sup>
Office	135-245	245 <sup>5/</sup>
Retail	200-260	235
Commercial Recreation	85-115	95
Hotel	3,000-3,500 (rooms)	3,200 (rooms)

Notes:

1/ Average density is 5 units per acre.

2/ Average density is 15 units per acre.

3/ Includes 40% of Industrial, Office and Residential Land Use Category.

4/ Includes 85% of Industrial and Office Land Use Category, plus 50% of Industrial, Office and Residential Land Use Category.

5/ Includes 15% of Industrial and Office Land Use Category, plus 10% of Industrial, Office and Residential Land Use Category.

Source: Economics Research Associates.

assumptions as to the expected value of these developments and their property tax revenue potentials were based on detailed conversations with assessors and real estate specialists in Maricopa County. After reviewing this report and confirming the ranges of costs utilized, some of these factors were utilized in this evaluation, in particular, the building construction costs by type, and the land values of improved land. A tax rate of \$10 per \$100 assessed value was used in this report, which reflects the current level of secondary and primary taxes within the District.

In summary, the estimated net property tax revenue increment over the next 25 years is \$944 million. The annual increment at the 25th year is estimated at \$101 million. These estimates represent property tax revenues on the building and land value of new development as well as from increases in value of lands and buildings where properties are already built up within the District. This is estimated at 5 percent

per year. (The figures are in constant 1983 dollars.)

### FLOOD PLAIN

Within these overall property tax revenue are amounts which will be made possible only by rescuing land from the flood plain. The Rio Salado project will make land available for development which previously was of limited value. In the broader sense, it is adding "new" land to those jurisdictions within the District. The acreages rescued from the flood plain under the final plan are shown in Table 18.

The increased property tax revenues generated by the development of land rescued from the flood plain have been estimated at \$312 million on a cumulative basis over the 25 year period and \$37 million on an annual basis by year 25.

**TABLE 18 New Private Development within the Current Flood Plain**

Use	(Acres)		
	Phase I	Phase II	Total
Industrial	353	563	916
Low Density Residential	0	444	444
High Density Residential	28	270	298
Office	1	90	91
Retail	17	88	105
Commercial Recreation	37	9	46
Hotel	0	10	10
Resort Hotel	66	95	161
Totals	502	1,569	2,071

Source: Carr, Lynch

## EMPLOYMENT IMPACTS

The level of employment generated has been projected for two types of employment: 1) one-time construction impacts from both public improvements and private development within the District, including jobs created outside the District as a result of the multiplier effect of construction expenditures, and 2) permanent employment by businesses which will locate within the District.

The cost of construction, construction payroll and person-years of construction employment are shown in Table 19. (The employment projections do not include employment to construct any upstream dams.)

Because much of the private development would occur elsewhere in the region if Rio Salado does not occur, we have estimated the employment impact as a result of public improvements separately.

In addition to direct construction employment, there will be indirect expenditures as a re-

**TABLE 19 Construction Expenditure Direct Impacts**

	<u>Phase I</u>	<u>Phase II</u>	<u>Total</u>
<u>Public</u>			
Construction Expenditures (000) <sup>1/</sup>	\$221,750	\$ 432,496	\$ 654,246
Construction Payroll (000) <sup>2/</sup>	120,002	227,824	347,826
Employment (Person Years) <sup>3/</sup>	6,000	11,390	17,391
Average Annual Employment	600	760	695
<u>Private Development</u>			
Construction Expenditures (000) <sup>4/</sup>	\$551,970	\$1,938,407	\$2,490,377
Construction Payroll(000) <sup>2/</sup>	275,985	969,204	1,245,189
Employment (Person Years) <sup>3/</sup>	13,800	48,460	62,259
Average Annual Employment	1,380	3,230	2,490

<sup>1/</sup> Carr,Lynch Associates. Does not include cost of construction of upstream dams.

<sup>2/</sup> Estimated at 50 percent of construction expenditures.

<sup>3/</sup> Based on an average annual salary of \$20,000.

<sup>4/</sup> Based on the acres of projected private development.

sult of primary purchases. These will include the household consumption of construction employees; the expenditures made by "suppliers to the suppliers" for product inputs, wages and salaries. and the ensuing household consumption from that, retailers' expenditures to meet household consumption, and so forth. These successive rounds of spending are also known as "indirect" or "multiplier" effects.

The regional multiplier used here to calculate the indirect impacts of construction costs and employment is taken from the report SMSA Multipliers: RIMS (Regional Industrial Multiplier Systems) Results of 61 SMSA's, prepared in January 1981 by the U.S. Department of Housing and Urban Development, Office of Policy Development and Research. This report specifically addresses the multiplier effects of the construction sector on metropolitan communities. Based on the information in this report, the construction multiplier for the Phoenix metropolitan area is

estimated at 2.9. (This includes both direct and indirect impacts. In other words, one construction dollar (\$1.00) will generate a total of \$2.90, including the initial \$1.00 expenditure.)

Taking into account the multiplier effect, the construction expenditures of \$654 million for public improvements represents nearly \$2.0 billion in direct and indirect spending in the region. The direct and indirect employment impacts from Rio Salado public improvements are as follows:

Employment  
(person years) 50,434  
Average Annual  
Employment 2,017

Permanent employment within the District is projected by type of employment and by phase in Table 20. This table shows that approximately 74,000 new jobs will be created within the Rio Salado development area. While these figures do not necessarily represent net new jobs to the region, they do represent employment opportunities in the central core of the

**TABLE 20 New Jobs**

Category	Phase I	Phase II	Total
Industry	19,470	27,720	47,190
Office	4,500	10,200	14,700
Retail	450	10,125	10,575
Hotel	450	1,342	1,792
Totals	24,870	49,387	74,257

Note: Based on the following employee per acre factors: industry - 30; office - 60; retail - 45. Hotel employment is estimated at 56 employees per 100 rooms.

Source: Economics Research Associates.

region, and opportunities within easy reach of the lower income residents of South Phoenix. Industrial employment accounts for a major portion of District employment.

Major efforts will be made to insure that a large portion of these jobs will be made available to residents of the

area. The District will explore the creation of programs to create incentives and/or requirements for developers and business owners to train residents and maintain jobs for them. Coordination will be effected between the available jobs and training programs of the proposed high-tech secondary school and South

Mountain Community College. The District will also adopt an affirmative action program that will apply to the direct public construction actions conducted by the District.

## UPSTREAM FLOOD CONTROL

There are potential savings due to upstream flood control from two sources: reduced flood damages and reduced flood insurance costs. The Corps of Engineers estimates potential damages saved at \$133 million in a 100 year event and \$527 million in a 500 year event.<sup>1/</sup>

Without a comprehensive development of the Rio Salado, additional levees will reduce damage but may be done piece-meal, leaving some areas still vulnerable to flooding.

<sup>1/</sup> Draft Economic Supplement for Flood Control. Central Arizona Water Control Study, September, 1981, U.S. Army Corps of Engineers.

## REGIONAL EFFICIENCY

Without Rio Salado, regional growth will continue to occur on the edges of urban areas, and underutilization of vacant land in the District will continue. Development under the Rio Salado Master Plan will help to reduce sprawl by opening up new land for development in the center of the region, providing housing and employment opportunities in the region and encouraging increased housing densities. Prior studies have shown that there are substantial public and private cost savings from reducing sprawl, including:

- o infrastructure costs (roads and utilities)
- o air pollution costs
- o energy costs (gasoline)
- o personal costs

## REGIONAL GROWTH

It is difficult to quantify the impact of Rio Salado on overall regional growth, although it cannot help but be positive. A review of literature on the impact of major open space and water-related projects shows that while these amenities are considered important to an area's overall growth and capture of the nation's growth, no one has been able to quantify this impact with any precision. It is clear, however, that if this investment in the Rio Salado project were to yield only a 1 or 2 percent increase in overall growth in the metropolitan area that the resultant economic activity would be a significant component in overall economic growth.

Rio Salado will offer features which will provide the Phoenix area with a positive and strong image, and which will add to the quality of life in the region, an important factor to businesses making metropolitan locational decisions. As such, it will help the region capture an additional share of the nation's

growth.

## RECREATIONAL BENEFITS

The primary values or direct benefits from recreation areas are those realized by the users of the area, a value that is difficult to quantify. While we have not done an analysis to quantify recreational user benefits, the Rio Salado obviously will provide substantial benefits of this kind. It will provide open space for recreation within easy reach of the metropolitan area population, and address the needs identified for open space for sports, bicycling, picnicking, and other recreational uses. These new recreational resources will also create a saving in travel costs now necessary for many to reach existing regional facilities.

## TOURISM

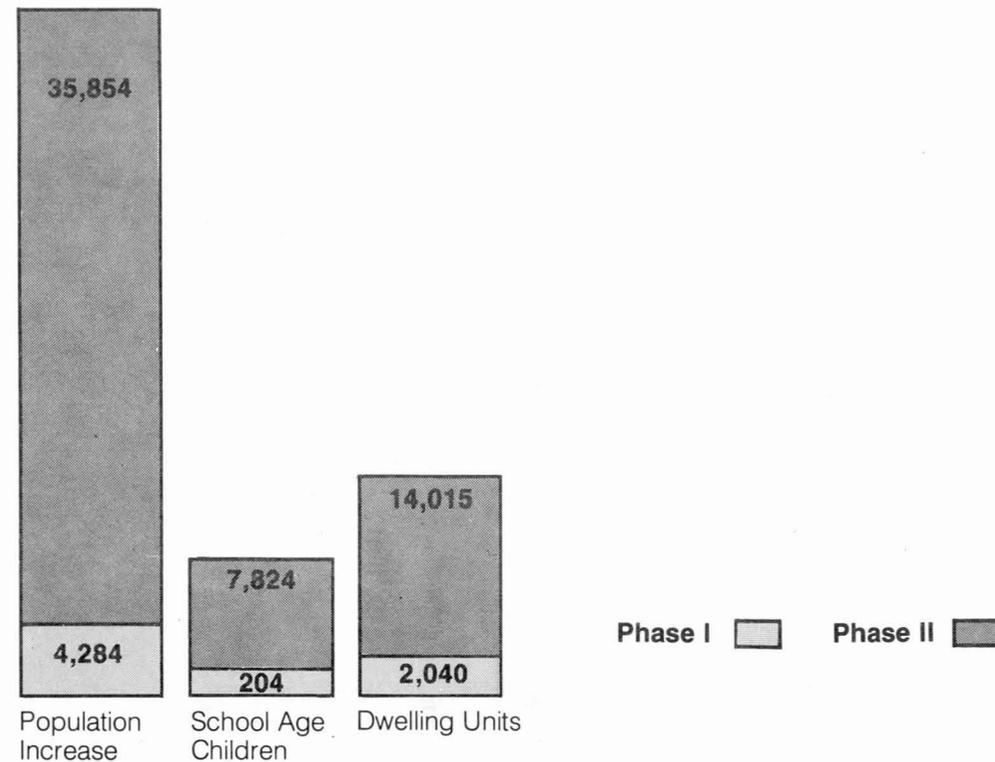
Rio Salado will have a positive impact on tourism by providing water recreation, resort hotels, equestrian facilities and other recreation facilities for area visitors. It will provide needed recreation facilities for hotels in downtown Phoenix.

A major exposition could potentially generate over \$200 million in tourist expenditures in the area, based on experience at other expositions.

More than 11 million visitors attended the 1982 International Energy Exposition held in Knoxville, Tennessee and six million people attended the Hemisfair held in San Antonio, Texas in 1968. While these expositions did not themselves turn healthy profits the economic benefits generated by millions of visitors to the host cities were tremendous in each case. The leadership of San Antonio, for example, regards Hemisfair as having been the positive turning point in

**TABLE 21 Summary of Population and New Housing Units**

<u>Category of Increase</u>	<u>Phase I</u>	<u>Phase II</u>	<u>Total</u>
Population Increase	4,284	35,854	40,138
School Age Children	204	7,824	8,028
Dwelling Units	2,040	14,015	16,055



the economic life and growth of that city. The exposition at Central Avenue could very well help to perform this role in Phoenix's efforts to rejuvenate its downtown area.

## POPULATION AND HOUSING

The projected increases in population, school age children and dwelling units within the District have been discussed in earlier sections and are summarized in Table 21.

## SUMMARY

A summary of the economic impacts of the Rio Salado Master Plan is shown in Table 22. These impacts are substantial, and generally positive.

**TABLE 22 Summary of Economic Impacts**

Category of Impact

New development opportunities      Development of land rescued from flood plain on both sides of the river for industrial, office, residential, hotel, recreational and other uses.

Effect on property values and tax revenues      Property values of land rescued from flood plain will increase dramatically (4 to 5 times); value of land adjacent to water land will increase substantially. Increase due to: 1) development of new property rescued from flood plain, and 2) changes in land values adjacent to river.

Cumulative Property Tax Increment over 25 years      \$ 944 million

Annual Property Tax Increment in year 25      \$ 101 million

Annual Tax Increment from Rescue of Land from Flood Plain      \$ 37 million

Category of Impact

Employment Impacts      74,260 permanent new jobs created in RSDD in industry, retail, hotel and services. Creation of new jobs in center of metro area, accessible to large labor force. 50,434 jobs (person-years) from construction of public improvements.

Flood Control      Potential savings due to upstream flood control from two sources: reduced flood damages and reduced flood insurance costs. Corps of Engineers estimates potential damages saved at \$133 million in a 100 year event and \$527 million in a 500 year event.

Regional Efficiency      Help to reduce sprawl by opening up new land for development in the center of the region, providing housing and employment opportunities in the region and encouraging increased housing densities. Cost savings due to decreased sprawl will include:
 

- o infrastructure costs
- o air pollution costs
- o energy costs
- o personal costs

**TABLE 22 (Cont.) Economic Impacts of Rio Salado Master Plan**

Category of Impact

Effect on Regional Growth      Difficult to quantify, but will make the area a more attractive place on a national scale, attracting incremental growth from industry locations decisions favoring Phoenix and from people's perception of Phoenix as a nice place to live.

Recreational User Benefits      Provides open space for recreation within easy reach of metro area population. Addresses needs identified for open space for sports, bicycling, picnicking, etc. Provides water recreation opportunities accessible to the public.

Sand & Gravel Operations      Sand & gravel operations phased out of Phoenix, Mesa and Tempe portions of Rio Salado. Alternative sites include upstream on Salt River and Aqua Fria, which may be as close to construction activity as present locations.

Category of Impact

Tourism      Rio Salado has direct impact on visitation and expenditures by providing water recreation opportunities, resort/hotels, equestrian facilities for area visitors. Exposition could generate over \$200 million in tourist expenditures in the area. Provides recreation facilities for hotels in downtown Phoenix.

Housing      16,000 new housing units will become available. Their closeness to employment opportunities will result in lower travel costs.

Public Costs      Major public expenditure items will include parks, lakes, and roads. Total public cost is \$654 million.<sup>1/</sup>

<sup>1/</sup> Does not include the cost of upstream flood control.

Source: Economics Research Associates.

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# Costs

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Although the previous sections have identified a number of benefits that will come from the development of the Rio Salado, these benefits come only as a result of a substantial monetary investment. The total public sector cost of putting this development in place over 25 years is \$654 million. The cost to operate and maintain its many elements is \$345 million over the 25 year time span. These costs are based upon 1983 dollars.

Detailed cost estimates are shown in the Appendix and are summarized here. They have been broken down into five year intervals based on our best projection of a likely flow of activity as described in other sections. For example, we have assumed that all land acquisition would occur during the first ten years, before the construction of dams upstream, while land values in the current flood plain are relatively low. Many of the estimates here will go up or down as the underlying

assumptions and concepts are tested and revised and as more detailed design work is performed. For example, we have assumed that all land within the riverbed might be acquired at an average cost of \$20,000 per acre. It is certain, however, that some parcels may require far more than this figure, especially parcels which have sand and gravel reserves. Some parcels may also be acquired for less.

## RIVERBED

As one might assume, creating the riverbed park will be costly. As seen in Table 23, the total capital cost of the new riverbed is \$342 million over 25 years. The sediment basin, a necessary first step, costs \$14 million alone. Creating the grass channel, parks and islands to withstand a 55,000 cfs floodwater flow will cost \$150 million. The lake system costs \$126 million. Bank protection needed for Phase I (years 1-10) development is \$8 million. New bridges, drop

structures, pumps, wells, and horse trails are also included.

## RIVERBANKS

On the banks alongside the river, the public cost is roughly \$343 million. This includes the acquisition and site preparation of properties to be leased to private interests; the parks, lakes, public golf courses, neighborhood improvements, local streets, and parkways; and the replacement housing for displaced families. The creation of public parks is estimated at \$17 million. Lakes on the banks, around which new development will be attracted, are \$11 million. The cost to relocate the electric power transmission lines is \$30 million.

Social and public service costs are also included in the cost estimates. Fifty million dollars is shown to construct and furnish new schools. There is \$16 million to provide new housing for displaced families, and additional amounts to pro-

vide rehabilitation loans to lower income homeowners, assistance to renters who wish to purchase a home, and other housing assistance programs.

**TABLE 23a Summary of Development Costs: Acquisition, Construction,  
and One-Time Costs**

Location	Time Periods:					Total (000)
	1-5	6-10	11-15	16-20	21-25	
<b>RIVERBED</b>						
Phoenix	\$ 9,140	\$ 13,600	\$114,940	\$ 31,300	\$ 100	\$169,080
Tempe	13,900	3,340	66,700	100	--	84,040
Mesa	--	3,240	19,100	--	--	22,340
SRIC	--	--	66,200	--	--	66,200
Totals	\$ 23,040	\$ 20,180	\$266,940	\$ 31,400	\$ 100	\$341,660
<b>RIVERBANKS</b>						
Phoenix	\$ 38,370	\$ 42,210	\$ 26,930	\$ 21,740	\$ 19,126	\$148,376
Tempe	25,280	13,868	2,100	5,440	5,200	51,888
Mesa	7,100	10,800	676	3,900	3,380	25,856
SRIC	--	--	--	2,350	--	2,350
Totals	\$ 70,750	\$ 66,878	\$ 29,706	\$ 33,430	\$ 27,706	\$228,470
<b>SERVICES</b>						
Phoenix	\$ 680	\$ 33,680	\$ 7,620	\$ 8,655	\$ 8,430	\$ 59,065
Tempe	6,144	84	6,077	56	--	12,361
Mesa	300	14	--	4,070	56	4,440
SRIC	--	--	8,250	--	--	8,250
Totals	\$ 7,124	\$ 33,778	\$ 21,947	\$ 12,781	\$ 8,486	\$ 84,116
<b>GRAND TOTAL</b>	<b>\$100,914</b>	<b>\$120,836</b>	<b>\$318,593</b>	<b>\$ 77,611</b>	<b>\$ 36,292</b>	<b>\$654,246</b>

**TABLE 23b Summary of Riverbed Development Costs**

	Time Periods:					Total (000)
	1-5	6-10	11-15	16-20	21-25	
Land Acquisition	\$ 9,180	\$ 12,420	\$ --	\$ --	\$ --	\$ 21,600
Armor Channel	7,860	--	--	--	--	7,860
Waterways, Lakes, Ponds	1,800	6,660	101,790	16,200	--	126,450
Grass Channel, Parks, Islands, Golf, Trails	3,800	800	101,500	15,000	--	121,100
Drop Structures	--	--	10,500	--	--	10,500
Pumps, Wells	400	300	1,100	200	100	2,100
Channel Relocation	--	--	14,850	--	--	14,850
New Bridges	--	--	23,200	--	--	23,200
Sediment Basin	--	--	14,000	--	--	14,000
<b>Totals:</b>	<b>\$ 23,040</b>	<b>\$ 20,180</b>	<b>\$266,940</b>	<b>\$ 31,400</b>	<b>\$ 100</b>	<b>\$341,660</b>

**TABLE 23c Summary of Riverbank Development Costs**

	Time Periods:					Total (000)
	1-5	6-10	11-15	16-20	21-25	
Land Acquisition	\$ 48,540	\$ 43,230	\$ --	\$ --	\$ --	\$ 91,770
Water Features	900	5,040	2,280	2,220	--	10,440
Parks, Golf, Equestrian	4,650	3,180	8,100	4,350	3,450	23,730
Parkway	1,300	1,300	7,800	18,200	15,080	43,680
Neighborhood Improvements	4,480	--	2,000	1,000	1,480	8,960
Rehab Loans/Grants	1,500	1,500	1,500	1,500	--	6,000
Replacement Housing	4,050	5,400	5,400	1,350	--	16,200
Land Prep. for Private Development	5,330	7,228	2,626	4,810	7,696	27,690
<b>Totals:</b>	<b>\$ 70,750</b>	<b>\$ 66,878</b>	<b>\$ 29,706</b>	<b>\$ 33,430</b>	<b>\$ 27,706</b>	<b>\$228,470</b>

**TABLE 23d Summary of One-Time Development Costs for Services**

	Time Periods:					Total (000)
	1-5	6-10	11-15	16-20	21-25	
Police	\$ 27	\$ 29	\$ 46	\$ 58	\$ 48	\$ 208
Fire	54	58	92	116	96	416
General Utilities	108	116	184	232	192	832
Powerline Relocation	6,000	3,000	21,250	--	--	30,250
Elem. Schools	--	--	--	12,000	8,000	20,000
Secondary School	--	30,000	--	--	--	30,000
Housing Assistance	435	375	375	375	150	1,710
Land Acquisition	500	200	--	--	--	700
<b>Totals:</b>	<b>\$ 7,124</b>	<b>\$ 33,778</b>	<b>\$ 21,947</b>	<b>\$ 12,781</b>	<b>\$ 8,486</b>	<b>\$84,116</b>

## OPERATING COSTS

Table 24 summarizes the annual operating costs. These costs range from approximately \$1.2 million per year in the first few years (1-5), rising to \$25.3 million when the project is significantly developed (years 21-25). Costs include the maintenance of the riverbed, the riverbanks, and the parkways. The cost of operating and staffing increased public services such as fire and police is also included. Operating the new schools, at \$11.5 million, represents nearly half of the annual cost. A significant portion--nearly 20% of the total operating budget in the later years--is the cost of water acquisition. By the end of the project (years 21-25), the annual cost of acquiring water will be \$4 million.

**TABLE 24a Summary of Annual Operating Costs**

Location	Time Periods:				
	1-5	6-10	11-15	16-20	21-25
(\$000)					
<b>RIVERBED</b>					
Phoenix	\$ --	\$ 113	\$ 1,705	\$ 2,550	\$ 2,550
Tempe	90	90	1,219	1,219	1,219
Mesa	--	--	405	405	405
SRIC	--	--	1,065	1,065	1,065
Totals	\$ 90	\$ 203	\$ 4,394	\$ 5,239	\$ 5,239
<b>RIVERBANKS</b>					
Phoenix	\$ 321	\$ 555	\$ 868	\$ 1,007	\$ 1,134
Tempe	130	166	242	322	346
Mesa	42	204	174	192	183
SRIC	--	--	--	58	58
Totals	\$ 493	\$ 925	\$ 1,284	\$ 1,579	\$ 1,721
<b>SERVICES</b>					
Phoenix	\$ 266	\$ 4,497	\$ 6,504	\$ 10,489	\$ 14,089
Tempe	333	465	1,299	1,411	1,411
Mesa	45	64	346	1,938	2,017
SRIC	30	30	814	814	814
Totals	\$ 674	\$ 5,056	\$ 8,963	\$ 14,652	\$ 18,331
<b>GRAND TOTAL</b>	\$ 1,257	\$ 6,184	\$ 14,641	\$ 21,470	\$ 25,291

**TABLE 24b Summary of Riverbed Annual Operating Costs**

Location	Time Periods:				
	1-5	6-10	11-15	16-20	21-25
Waterway	\$ 30	\$ 141	\$ 1,636	\$ 2,106	\$ 2,106
Grassed Channel	60	60	2,752	3,127	3,127
Bridges	--	2	6	6	6
TOTAL	\$ 90	\$ 203	\$ 4,394	\$ 5,239	\$ 5,239

**TABLE 24c Summary of Riverbank Annual Operating Costs**

Location	Time Periods:				
	1-5	6-10	11-15	16-20	21-25
Water Features	\$ 15	\$ 99	\$ 147	\$ 186	\$ 186
Parks & Rec.	205	355	791	1,073	1,246
Neighborhood Rehab. Areas	45	45	65	75	90
Parkway	6	12	47	131	199
Property Maint.	222	414	234	114	0
TOTAL	\$ 493	\$ 925	\$ 1,284	\$ 1,579	\$ 1,721

**TABLE 24d Summary of Annual Operating Costs for Services**

Location	Time Periods:				
	1-5	6-10	11-15	16-20	21-25
Police	\$ 54	\$ 114	\$ 240	\$ 383	\$ 516
Fire	108	228	480	766	1,033
Utilities	44	91	192	307	413
Schools	--	4,000	4,000	8,500	11,500
Water Acquisition & Pumping	168	323	3,751	4,396	4,569
Project Admin.	300	300	300	300	300
TOTAL	\$ 674	\$ 5,056	\$ 8,963	\$ 14,652	\$ 18,331

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# IMPLEMENTATION

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# Overall Strategy

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The successful reclamation of the Rio Salado will require a strong central body to guide and control the development process. Implementation has five principal dimensions:

1. acquiring the land;
2. constructing the public improvements;
3. controlling private development;
4. securing the necessary financing; and
5. operating and maintaining the completed facilities.

Some elements of this implementation strategy now seem clear. In other areas, the financing in particular, there are various options yet to be explored. The following sections discuss these recommendations and options in more detail, but we can summarize them as follows.

The District, confined within the proposed new boundaries shown in Fig. 45, should maintain its power to acquire land by purchase or exchange, or, with the consent of the local government, by eminent domain. It should have the power to issue notes and bonds secured on assets and income; to receive or sell land to private developers; to oversee design quality subject to local government regulations; and to grant funds in support of special public services.

Although the District boundaries have included the Salt River Pima-Maricopa Indian Community, the District could not own land, tax anyone, or exercise any development controls within this jurisdiction because of its special legal status. The District should, however, seek permission from the Indian Community to build and maintain the riverbed park and sedimentation basin and strive for a continued cooperative planning relationship with the Tribal Coun-

cil. This upstream work is vital to the entire project.

In the first ten years, the District and the State Land Trust should acquire all land within the riverbed and on the riverbanks within the parkways, which is not already held by other public agencies. As upstream flood control is achieved, the District would see to the progressive construction of the riverbed park and the levees, and would prepare the riverbank lands within the parkways for private development, while relying on the normal provisions of public infrastructure such as roads and services by local government. Special entities, such as the State Fair would prepare the grounds for their particular uses.

The District and the Land Trust would lease or sell the lands within the parkways to private developers for the uses indicated in the plan. The Rio Salado Design Review Commission would review all projects within the District. This Commission would be a unified board com-

posed by the District and the various local governments.

The District would be responsible for the operation and maintenance of the entire riverbed park and much of the public open space which will be built on the riverbanks. However, this responsibility would most likely be delegated to local government agencies under contract with the District so as to avoid duplication of effort. In addition, the District would manage the lands leased to private or semi-public entities. Other public works, such as roads, bridges, and utilities, would be maintained by public or semi-public bodies normally charged with them. The District would be responsible to see that existing residential neighborhoods are conserved, and that necessary relocation is achieved without social loss. It would also stimulate the establishment of special public services, such as the alternative school, the special museums, the cultural center, and the new recreational services.

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Capital and operating costs would be covered by the sale of general obligation bonds, tax increment financing, and the proceeds of land sales and leases. While the latter two sources will more than cover accumulated costs toward the end of the 25-year period, they fall below capital and operating costs in the first ten or fifteen years - a situation typical of public works of this magnitude. Other revenue sources and devices must therefore be tapped to cover these "up-front" costs.

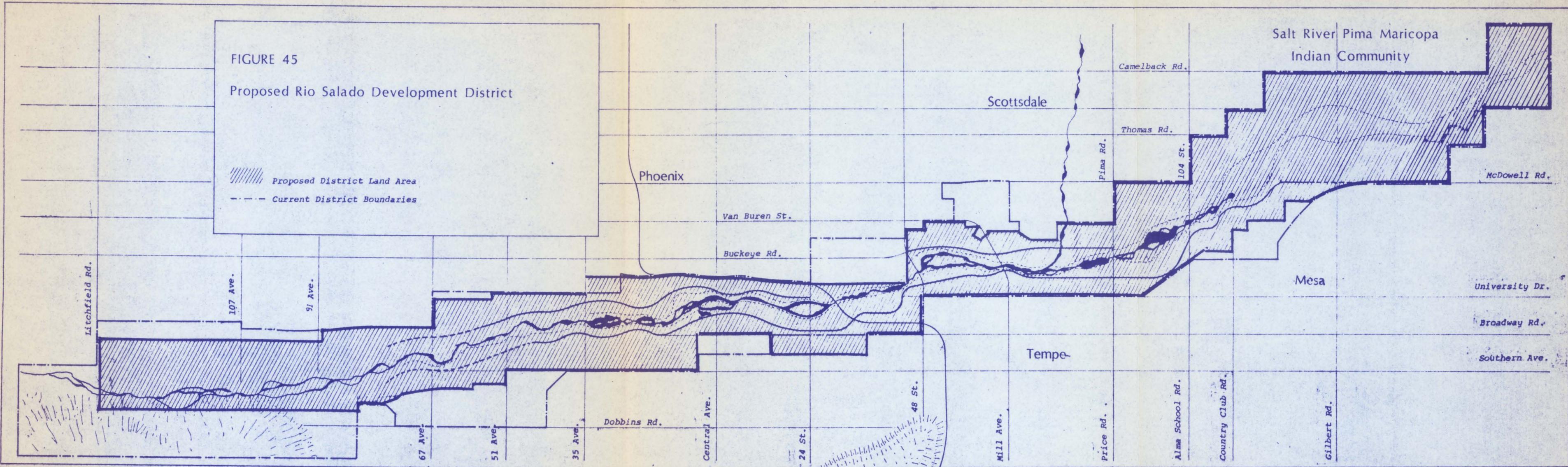
There are a substantial number of options of this kind, including county property taxes, local sales taxes, user fees, normal public grants and loans, the use of a state revolving fund for land acquisition, and others. These options, and a comparison of the resulting cost and revenue streams, are shown in the section on financing.

In general, all the above recommendations and possibilities for a strategy of implementation are spelled out in

the succeeding sections, along with the reasoning that lies behind them. A final section summarizes the legislative actions that would be required to permit this strategy.

FIGURE 45  
Proposed Rio Salado Development District

Proposed District Land Area  
Current District Boundaries



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# Financing

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This section presents an analysis of potential funding sources, including an evaluation of their potential magnitude and appropriateness for this project. The costs required for the development and operation of the Rio Salado Development District presented earlier are compared to potential District revenue streams, and financing strategies are recommended.

## FUNDING SOURCES

Development of Rio Salado may be funded through varying sources. The categories of revenue sources which have been examined include the following:

- Property Taxes
- Sales Tax Revenue
- Local Personal Income Tax
- Corporate Income Tax
- Excise Taxes
- Utility Taxes
- Pari-mutual Tax
- Commuter Tax
- Lotteries
- Business Contributions
- Amusement Tax

Land Leases  
Grants and Loans

A summary description of these mechanisms is shown in Appendix E, including the key characteristics of these funding sources, the advantages and disadvantages of each potential source, the implementation requirements and the current uses of such funds.

The annual revenue potential and current levies from four revenue sources -- the property tax, sales tax, room tax and Exposition Tax, and land leases -- are shown in Table 25.

In addition to these sources of funds the characteristics of potential bonding alternatives have been reviewed. Included were general obligation bonds, revenue bonds, special assessment bonds and tax increment bonds. The results are summarized in Table 26.

TABLE 25 Revenue Potential from Funding Sources

<u>Sales (Transaction Privilage) Tax</u>	<u>For Each Increment</u>	<u>Annual Dollar Increment</u>	<u>Existing Levy</u>	<u>Incidence of Taxation</u>	<u>Statutory Situation (Authority)</u>	<u>Longterm Stability of Funds</u>		<u>Comment</u>
						<u>Flow</u>	<u>Growth</u>	
County-wide	per each 1% of county sales	\$92,000,000 <sup>3/</sup>	no county levy. state levy is 4%	retail business operators partly pass through	state, cities and towns may levy taxes	yes	yes	county cannot levy sales tax
Phoenix	per each 1% of sales	\$68,200,000 <sup>4/</sup>	1%	retail sales except food items	existing	yes	yes	city sales taxes can be earmarked for specific purposes
Tempe	per each 1% of sales	\$ 9,200,000 <sup>4/</sup>	1%	retail sales except food	existing	yes	yes	city sales taxes can be earmarked for specific purposes
Mesa	per each 1% of sales	\$14,200,000 <sup>4/</sup>	1%	retail sales except food	existing	yes	yes	city sales taxes can be earmarked for specific purposes
<u>Room-Tax</u>								
County-wide	per each 1% of sales	\$4,400,00	no county levy	hotel operators	county does not have authority	yes	yes	
Phoenix	per each 1% of sales	NA	.5%	hotel operators	existing			Phoenix room tax is dedicated to the Phoenix Civic Center
Tempe	per each 1% of sales	NA	yes	hotel operators	existing	yes	yes	
Mesa	per each 1% of sales	NA	none	hotel operators	Mesa does not have a room tax but could have one	yes	yes	

TABLE 25 (cont.) Revenue Potential from Funding Sources

	For Each Increment	Annual Dollar Increment	Existing Levy	Incidence of Taxation	Statutory Situation (Authority)	Longterm Stability of Funds		Comment
						Flow	Growth	
<u>Property Tax</u> <sup>1/</sup>								
County-wide	per each 1 cent levy on secondary values <sup>2/</sup>	\$ 603,347	\$0.16 per \$100 assessed value	property owners	existing	yes	yes	Taxes levied on secondary values are subject to voter approval but are not subject to growth limits. County support of Rio Salado is said to be high.
Phoenix	per each 1 cent levy on secondary values <sup>2/</sup>	\$ 270,620	\$0.79 per \$100 assessed value	property owners	existing	yes	yes	
Tempe	per each 1 cent levy on secondary values <sup>2/</sup>	\$ 41,900	\$0.63 per \$100 assessed value	property owners	existing	yes	yes	
Mesa	per each 1 cent levy on secondary values <sup>2/</sup>	\$ 46,100	\$0	property owners	existing	yes	yes	
RSDD Special District	per each 1 cent levy on secondary values <sup>2/</sup>	\$ 12,500 in year 1 \$ 94,400 annually in Year 25	none	property owners	special districts must be approved by vote of property owners within proposed district	yes	yes	Good potential source of funds if property owners favor creation of a special district.

TABLE 25 (cont.) Revenue Potential from Funding Sources

	For Each Increment	Annual Dollar Increment	Existing Levy	Incidence of Taxation	Statutory Situation (Authority)	Longterm Stability of Funds		Comment
						Flow	Growth	
<u>World's Fair Tax</u>	5% tax on ticket sales, rides, etc. at proposed World's Fair	\$4.8 million one time revenue source	4% state sales tax on amusements.	World's Fair visitors	Amusements already taxed by state under sales tax	no	no	One-time tax on World's Fair
<u>Land Leases Within District</u>	10% of land value	\$ 36 million annually in Year 25		Property leased for private development	yes	yes	yes	District must acquire property

- 1/ For purposes of this analysis, only secondary assessed values and tax rates have been used. Taxes levied for secondary purposes include all property taxes levied for payment of bonds, special district levies and voter approved overrides. The average total tax levy in the District on both primary and secondary assessments is \$10 per \$100 assessed value.
- 2/ The tax rates in Arizona are expressed in terms of dollars per \$100 assessed value. For this analysis, a 1 cent levy means a 1 cent levy per \$100 assessed value.
- 3/ Based on 1981 County retail sales of \$9.2 billion. (Source: Arizona Statistical Review.) Since the sales tax is levied on some services as well as retail sales, this figure understates the annual dollar increment from a county wide sales tax.
- 4/ Based on FY 1980-81 local sales tax levies reported in the Sales Tax Survey, March 1982, by the League of Arizona Cities and Towns.
- 5/ Assumes 6 million visitors each spend \$16 at the Fair.

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**TABLE 26 Bonding Alternatives**

<u>Category</u>	<u>Characteristics</u>	<u>Advantages</u>	<u>Disadvantages</u>
General Obligation (GO) Bonds	Secured by issuer's pledge of full faith, credit and taxing power - issued only by state, county, cities, and special districts.	Spreads costs of public facility over entire community.	Requires voter approval.
Revenue Bonds	Payable only from revenues derived from operation of facilities such as user fees, land leases, rental payments, etc.	Not subject to statutory debt limits.	Requires stable source of revenues.
Special Assessment Bonds	Payable from proceeds of assessments on property owners who directly benefit.	Equity is high.	Limited marketability and higher interest charges.
Tax Increment Financing	Payable from increases in tax revenues collected on property within the TIF district. May be exercised by cities, counties, or entities specifically empowered by the Arizona Legislature to do so.	Increment directly related to improvement/development of the District.	Draft legislation to permit Tax Increment Financing has not yet been adopted by State Legislature. TIF also requires constitutional amendment. Tax increments may be insufficient in early years to cover debt requirements.

Source: Economics Research Associates.

## FUNDING APPROACH NO. 1

After the evaluation of the revenue sources described above, an approach was designed that offers a realistic funding potential over the long term for Rio Salado. This approach uses three major sources of funding: tax increment financing, land leases, and land sales.

### Land Lease Revenues

The practice of leasing publicly owned land to private developers is increasing nationwide. The stimulus for this has been twofold: first, state and federal initiated tax reform movements are threatening municipal budgets and are forcing cities to look to new sources of revenues; second, the increasing shortage of prime vacant or underdeveloped land in urban areas is focusing attention on the remaining development sites, many of which are publicly owned.

There are several advantages to the public sector in leasing

out land for private development. First, ground leases can generate substantial annual lease revenues often above what could be realized if the property were taxed as privately owned; second, the public land owner will retain ultimate control of the land and will be able to control the type of development that is built on the site; third, in some cases, public amenities will be developed on-site with private financing. On the other hand, too many controls over the development concept and the lease can result in fewer bids by the private developer; and the landowner could potentially lose the fee interest in the land if the leasehold interest is subordinated to the developers' lender as mortgage security and the developer defaults on both the rent and mortgage payments.

There are also advantages to the private developer in leasing public land for the purposes of commercial development. First, a ground lease can reduce the amount of

equity that must be put into the deal. Second, sites are often particularly desirable if public infrastructure such as parks are being planned in the area. There are also disadvantages to developers: competition with other developers for the leasehold interest can increase upfront development costs; deal negotiations can often be lengthy and complicated; and leasehold mortgage financing can be difficult to obtain.

In determining the appropriate rent levels for leasing public land, several techniques may be used:

- a) Let the marketplace decide through a preliminary bidding process.
- b) Estimate land value through the appraisal method and use a simple rule of thumb that rent will approximately equal the amount a developer would pay if the land were purchased with institutional financing.

- c) Use a capitalization technique, where total land value times the desired return on project cost equals desired rent level.

In determining land lease revenue potentials for Rio Salado, it has been assumed that:

- o Property within the riverbed and along the riverbanks will be owned by the Rio Salado Development District and the State Land Trust and leased to private developers, except in the case of some residential property which will be sold off.
- o Sixty percent of the acres developed for private use within the parkways, shown in Table 27, will be leased from the District.
- o Land will be leased at a rate of 10 percent of its market value annually.

**TABLE 27 New Private Development within the Parkways**

Use	(acres)		
	Phase I	Phase II	Total
Industrial	266	616 <u>1/</u>	882
Low Density Residential	0	327	327
High Density Residential	38	439 <u>2/</u>	477
Office	0	116 <u>3/</u>	116
Retail	17	68	85
Commercial, Recreation	37	14	51
Hotel	0	10 <u>4/</u>	10
Resort Hotel	65 <u>5/</u>	105 <u>6/</u>	170
Private Golf	0	160	160
Totals	423	1,855	2,278

Notes:

- 1/ Includes 85% of Industrial and Office Land Use Category, or 70 acres, plus 50% of Industrial, Office and Residential Land Use Category, or 183 acres.
- 2/ Includes 40% of Industrial, Office and Residential Land Use Category, or 147 acres.
- 3/ Includes 15% of Industrial and Office Land Use Category, or 14 acres, plus 10% of Industrial, Office and Residential Land Use Category, or 37 acres.
- 4/ Two hotels (800 rooms).
- 5/ One resort hotel (400 rooms).
- 6/ Four resort hotels (1,600 rooms).

Source: Carr-Lynch Associates and Economics Research Associates.

o The market value of the land will increase at a rate of 5 percent per year, and land leases will be determined based on the market value of the land in the year the lease is negotiated. Thus, the appreciation in land value is reflected only in new leases as additional land is developed.

restrictions in the use of funds collected by this entity.

Land lease revenues to the District could be substantial, as seen below and presented in detail in Table 28 and Figure 46:

Annual in	
Year 25	\$ 35,558,000
Cumulative	
Over 25 Years	\$347,567,000

These figures represent only about 60% of the total lease potential within the parkways. Lease revenues of approximately \$232 million would also be available to the State Land Trust over the 25 year period. This additional sum, however, has not been added to the project's overall revenue equation because of possible legal re-

**TABLE 28 Land Lease Revenues**

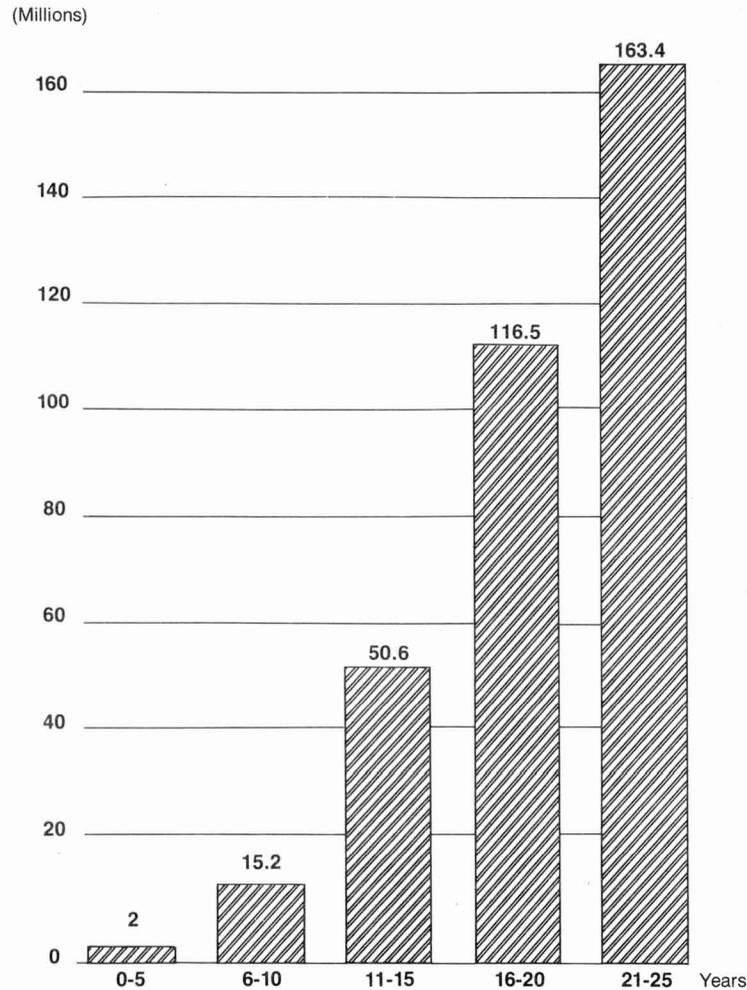
Year/ Phase	(000) Percent Completed	Value of Master Plan Land	Value of Land Leased	New Increment of Lease Proceeds	Annual Lease Proceeds
1/I	0	34937	0	0	0
2/I	2.5	36684	917	92	92
3/I	6.1	38518	2350	235	327
4/I	7.4	40444	2993	299	626
5/I	9.8	42466	4162	416	1042
6/I	11.1	44589	4949	495	1537
7/I	14.7	46819	6882	688	2225
8/I	14.7	49160	7227	723	2948
9/I	16	51618	8259	826	3774
10/I	17.2	54199	9322	932	4706
-----					
11/II	6.6	225448	14880	1488	6194
12/II	7	236720	16570	1657	7851
13/II	7.5	248556	18642	1864	9715
14/II	8.5	260984	22184	2218	11934
15/II	10.3	274033	28225	2823	14756
16/II	11.3	287735	32514	3251	18008
17/II	9.4	302122	28399	2840	20847
18/II	8.5	317228	26964	2696	23544
19/II	7.5	333089	24982	2498	26042
20/II	5.6	349744	19586	1959	28001
21/II	4.7	367231	17260	1726	29727
22/II	4.2	385593	16195	1619	31346
23/II	3.3	404872	13361	1336	32682
24/II	3.3	425116	14029	1493	34085
25/II	3.3	446372	14730	1473	35558
Cumulative Total					347567

Notes:

Annual lease payments based on 10% of land value  
 Annual induced appreciation from development 5%

Source: Economics Research Associates

**FIGURE 46 Land Lease Revenues**



Tax Increment Financing

Tax increment financing is a method of linking the funding of development efforts with the anticipated returns to the tax increment district in the form of property taxes. In practice, a district is defined in which the proceeds of a bond issue will be used to stimulate development. The current real estate tax yield for all properties within the district is calculated and the contribution of these taxes to the taxing jurisdictions is frozen at that level. As development occurs, properties in the District will be revaluated according to the general appreciation realized due the overall improvement of the district. The difference in the tax yield from the district between the new and the former level of taxation flows into a fund which is pledged to the retirement of the bonds that were used to stimulate the process. Once the bonds are retired, the tax yield in subsequent years flows directly to the taxing jurisdictions within the District.

Tax increment finance need not be tied strictly to the issue of bonds, but may in some cases be used to fund project costs directly as they occur. However, in order for this to work successfully, there must be a very strong commitment (such as a contract) to incur these costs.

Tax increment financing is relatively new as a method of financing urban revitalization and is not currently allowed under Arizona law. Its use will require an amendment to the Arizona Constitution. It is potentially an excellent tool for financing at least part of Rio Salado.

An evaluation of tax increment financing has shown that the tax increment is substantial but is not enough to cover all the development costs associated with such a large scale

project in the early years. As is generally true, the tax increments build up over time as development occurs.

A proposed tax increment district is shown in Figure 45, and would coincide with the general revised boundary of the Rio Salado Development District. Tax increments within these proposed boundaries have been calculated. They are based on any additional new development within the District, as well as on an annual 5 percent increase in the overall Limited Assessed Value of other property within the tax increment district, which is estimated at \$96 million.<sup>1/</sup> The tax increments from new developments have been calculated based on the acreage figures shown previously in Table 4, and on estimates of costs of construction for various development types. Tax increments for new developments

<sup>1/</sup> The current assessed value of the tax increment district as proposed is estimated to be 85 percent of the assessed value of the present Development District, which is \$113 million, since the size of the proposed tax increment district is slightly smaller than that of the existing planning area.

have been calculated based on both building value and land value. Despite the fact that the privately developed land will be leased from the District or other public entities, private developers would make a payment in lieu of taxes to the tax increment district.

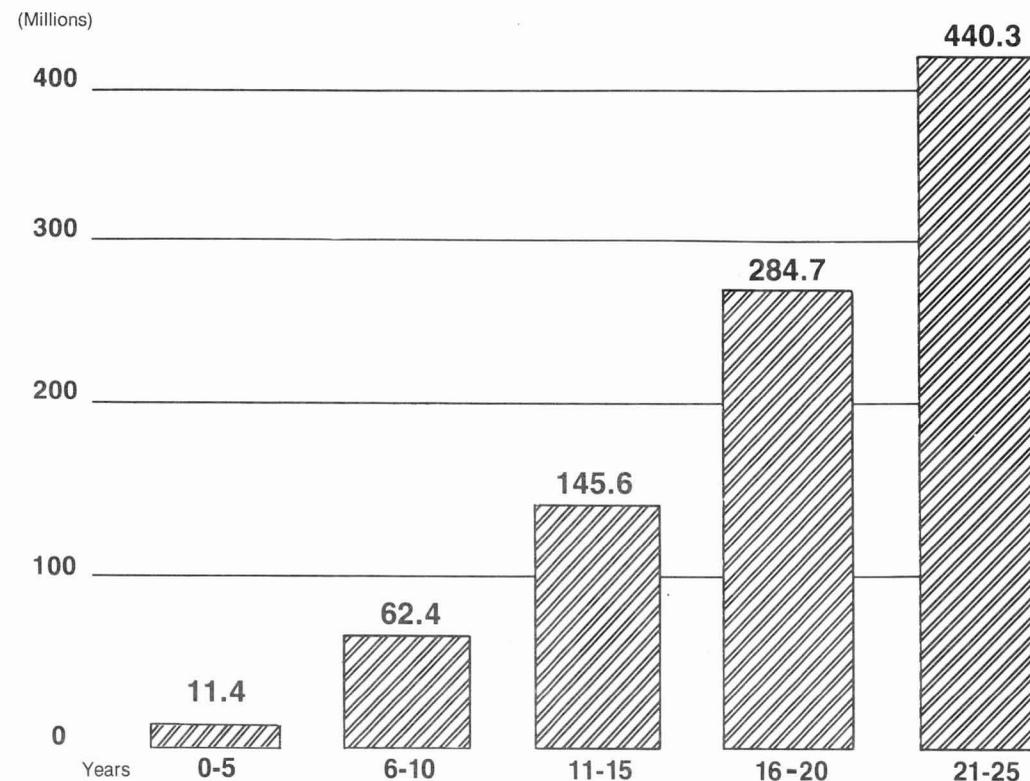
Estimated Tax increment revenues calculated in Table 29 within the proposed RSDD boundaries, are shown graphically in Figure 47 for five year increments and can be summarized as follows:

Annual increase at year	
25	\$101,416,000
Cumulative revenue over	
25 years	\$944,467,000

Because of the size of the proposed tax increment district and the development and operating costs which we propose to be borne by local jurisdictions such as parkways, bridges, and schools, total tax increments

should be shared by the District with the underlying taxing jurisdictions as appropriate.

Figure 47 Tax Increment Revenues



**TABLE 29 Tax Increment Revenues (000)**

Year/ Phase	New Assessed Value Increment	Value of New Construction (Cum.)	Existing Property Assessed Value	Annual Assessed Value Increment	Tax Rate (/ \$100)	Annual Tax Increment
1/I	5000	5000	96200	5000	10.00	0
2/I	9000	14250	101010	19060	10.00	500
3/I	11000	25963	106061	35823	10.00	1906
4/I	12000	39261	111364	54424	10.00	3582
5/I	13000	54224	116932	74955	10.00	5442
6/I	14000	70935	122778	97513	10.00	7496
7/I	15000	89482	128917	122199	10.00	9751
8/I	17000	120956	135363	150119	10.00	12220
9/I	17000	133503	142131	179435	10.00	15012
10/I	17000	157179	149238	210216	10.00	17943
11/II	20000	185038	156700	245537	10.00	21022
12/II	22000	216289	164535	284624	10.00	24554
13/II	27000	254104	172761	330665	10.00	28462
14/II	32000	298809	181399	384009	10.00	33067
15/II	37000	350750	190469	445019	10.00	38401
16/II	37000	405287	199993	509080	10.00	44502
17/II	32000	457551	209993	571344	10.00	50908
18/II	27000	507429	220492	631721	10.00	57134
19/II	22000	554800	231517	690117	10.00	63172
20/II	22000	604540	243093	751433	10.00	69012
21/II	20000	654767	255247	813815	10.00	75143
22/II	20000	707506	268010	879315	10.00	81381
23/II	17000	759881	281410	945091	10.00	87932
24/II	17000	814875	295481	1014156	10.00	94509
25/II	17000	872619	310255	1086674	10.00	101416

Cumulative Total 944467

Notes:

Annual induced appreciation from development 5%  
 Starting tax rate (per \$100 value) \$10.00  
 Annual rate of tax increase 0%  
 Lag from construction to tax collection 1 Year

Source: Economics Research Associates

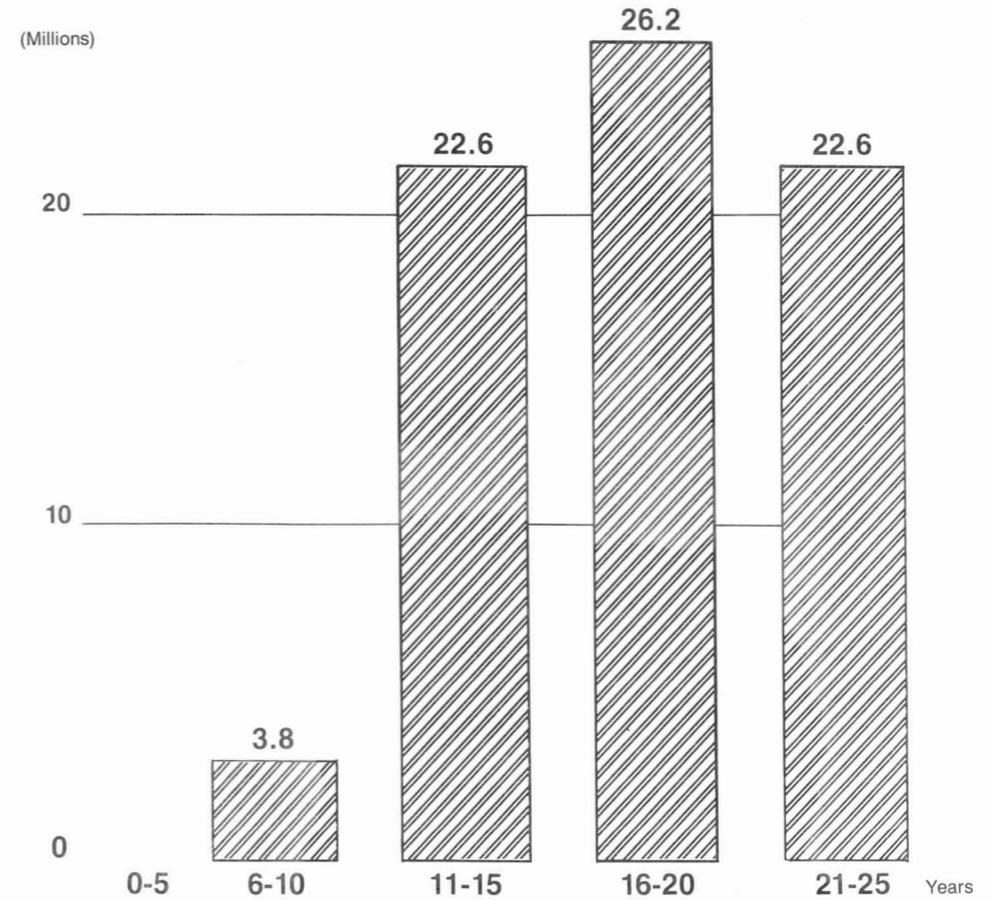
Land Sales

Some of the land acquired by the District in the early stages of the project will be sold at a later date for development of ownership residential units. Land sales revenues are estimated in Table 30 and Fig. 48 and total \$75 million over a 25 year period. These estimates are based on the sale of all low density residential properties and 30 percent of the high density parcels. Additional information outlining the assumptions and methodology underlying these calculations is presented in the Appendix.

**TABLE 30 Land Sales Revenues**

<u>Years</u>	<u>Acres</u>	<u>Value (thousands)</u>	<u>Sales Revenue (Millions)</u>
1- 5	0	\$ 0	\$ 0
5-10	24	160,000	3.84
10-15	141	160,000	22.56
15-20	164	160,000	26.24
<u>20-25</u>	<u>141</u>	<u>160,000</u>	<u>22.56</u>
Total	470		\$ 75.20

**FIGURE 48 Land Sales Revenues**



Summary of District Revenues

A summary of land lease revenues, tax increments, and land sales revenues is shown in five-year increments in Table 31 and annually in Table 32. Also shown in Table 31 is a summary of District capital and operating costs for the same time periods.

The costs in Table 31 do not include financing costs, which must be considered for those portions of the project which will be financed through bonding. It is difficult to say accurately what the costs will be including financing, without a detailed projection on an annual basis of revenues and disbursements of costs, and of interest rates. However, two rules of thumb can be consid-

**TABLE 31 Project Revenues and Costs**

(\$ Millions)						
<u>Project Costs</u>	Years = <u>1-5</u>	<u>6-10</u>	<u>11-15</u>	<u>16-20</u>	<u>21-25</u>	<u>Total 1-25</u>
Capital	100.9	120.8	318.6	77.6	36.3	654.2
Operating	<u>6.3</u>	<u>30.9</u>	<u>73.2</u>	<u>107.3</u>	<u>126.5</u>	<u>344.2</u>
Totals:	107.2	151.7	391.8	184.9	162.8	998.4
<u>Revenues</u>						
Tax Increment	11.4	62.4	145.6	284.7	440.3	944.4
Land Lease	2.0	15.2	50.6	116.5	163.4	347.7
Land Sales	<u>0</u>	<u>3.8</u>	<u>22.6</u>	<u>26.2</u>	<u>22.6</u>	<u>75.2</u>
Totals:	13.4	81.4	218.8	427.4	626.3	1,367.3
<u>Surplus (deficit)</u>	(93.8)	(70.3)	(173)	242.5	463.5	368.9

Source: Carr, Lynch Associates and Economics Research Associates.

**TABLE 32 Annual Rio Salado Development District Revenues**

(\$Millions)

<u>Year</u>	<u>Tax Increment Revenues</u>	<u>Land Leases</u>	<u>Land Sales</u>	<u>Total Revenues</u>
1	\$0	\$0	0	\$0
2	0.5	.1	0	.6
3	1.9	.3	0	2.2
4	3.6	.6	0	4.3
5	5.4	1.0	0	6.5
6	7.5	1.5	0	9.1
7	9.8	2.2	.8	12.9
8	12.2	3.0	1.0	16.2
9	15.0	3.8	1.0	20.0
10	17.9	4.7	1.0	23.8
11	21.0	6.2	4.5	31.8
12	24.6	7.9	4.5	37.1
13	28.5	9.7	4.5	42.9
14	33.1	12.0	4.5	49.7
15	38.4	14.8	4.5	57.8
16	44.5	18.0	5.2	67.9
17	50.9	21.0	5.2	77.1
18	57.1	23.5	5.2	86.0
19	63.2	26.0	5.2	94.6
20	69.0	28.0	5.2	102.3
21	75.1	29.7	4.5	109.5
22	81.4	31.3	4.5	117.4
23	87.9	32.7	4.5	125.2
24	94.5	34.1	4.5	133.2
25	101.4	35.6	4.5	141.6
Totals	944.4	347.7	74.8	1,366.9

Source: Economics Research Associates

ered in estimating the impact of financing.

First, it generally takes \$2.00 to \$2.50 to raise \$1.00 through bonding depending on interest rates. Thus, if the \$100 million in project costs in years 1-5 was bonded at the current 9 percent interest rate over 25 years, the cost, over 25 years, including financing, would total \$250 million.

Second, the ratio of the total bond amount to the annual debt payment is currently about 9 or 10 to 1. In other words, a \$10 million bond will need \$1 million annually for debt retirement over 25 years. Applying this ratio to annual District revenues would give a sense of the bonding capacity of these revenues in a given year. As revenues increase, so does the bonding capacity. A preliminary look at the bonding capacity of the annual District revenues (tax increments, and lease revenues and land sales) shown in Table 33 indicates the following levels:

Year: 3 \$20 million  
 5 \$60 million  
 10 \$240 million  
 15 \$575 million

As revenues increase in later years, it may be desirable to fund costs directly rather than through bonding, to reduce financing costs.

Taking into consideration the above generalities and the projected revenues and costs, in Table 31, tax increment financing alone throughout much of the 25 year period is not sufficient to cover total project costs. A combination of tax increment financing and tax-exempt bonds backed by land lease revenues may be a viable method of financing, depending on the actual timing of costs and financing costs.

**TABLE 33 Bonding Capacity and Current Bonded Indebtedness as of June 30, 1982**

	(\$ millions)		
	Current Indebtedness	Bonding Limit	Unused Capacity
Maricopa County	\$ 351 <sup>1/</sup>	\$ 800	\$ 765
Phoenix <sup>2/</sup>	548	779	231
Mesa <sup>3/</sup>	45	120	75
Tempe <sup>4/</sup>	16	48	32

Notes:

<sup>1/</sup> As of June 30, Maricopa County had \$85 million in bonds outstanding and \$50 million available in the debt retirement fund, for a current indebtedness of \$35 million.

Source: Maricopa County Finance Department.

<sup>2/</sup> Source: Annual Financial Report, June 30, 1982, City of Phoenix.

<sup>3/</sup> Source: Budget and Research Department, City of Mesa.

<sup>4/</sup> Source: City of Tempe Annual Financial Report, June 30, 1982.

Source: As noted above and Economics Research Associates.

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## FUNDING APPROACH NO. 2

Following the completion of the preliminary Master Plan, the Rio Salado Board of Directors appointed an advisory committee of experts in the field of real estate finance and development. This committee reviewed in detail the assumptions and conclusions of Funding Approach No. 1, as described above. Based on this study, the committee made several recommendations that would result in adjustments and refinements to that approach. These changes will provide additional detail to the financing strategy, as well as alternative methods of implementing the project.

The basic change in the second approach is the elimination of tax increment financing as the principal device for raising revenues. In its place a countywide property tax levy is inserted. The approach

deals with two issues--the need for up-front funding before tax increment would begin to generate revenues and the possibility that tax increment may never become legally feasible.

Other major changes include adding the effects of inflation and financing costs. Several other different assumptions are used. They are described below:

### Project Costs

The need for funding is, of course, based on the costs of the project. These costs are described in detail in other sections of the Master Plan. For purposes of this funding approach, all of the development and operating costs were inflated over the period in which they will be incurred. For development costs, Tables 23b, 23c, and 23d were used as the basis for these inflation

calculations. Tables 24b, 24c, and 24d were used for operating costs. The results for development are shown in Tables 34, 35 and 26. The inflated annual operating costs are summarized in Table 37. The procedure used for calculating the inflation factors is described in the Appendix.

TABLE 34 Summary of Riverbed Development Costs (Inflated)

	Time Periods:					Total
	1-5	6-10	11-15	16-20	21-25	
Land Acquisition	\$10,371	\$17,908	\$ ---	\$ ---	\$ ---	\$ 28,279
Armor Channel	9,157	---	---	---	---	9,157
Waterways, Lakes, Roads	2,097	10,531	218,459	47,190	---	278,277
Channel Parks, etc.	4,427	1,265	217,837	43,694	---	267,223
Drop Structures	---	---	22,535	---	---	22,535
Pumps, Wells	448	420	1,930	439	275	3,512
Channel Relocation	---	---	31,871	---	---	31,871
New Bridges	---	---	49,791	---	---	49,791
Sediment Basin	---	---	30,046	---	---	30,046
TOTAL	\$26,500	\$30,124	\$572,469	\$91,323	\$ 275	\$720,691



TABLE 36 Summary of One-Time Development Costs for Services (Inflated)

	Time Periods					Total
	1-5	6-10	11-15	16-20	21-25	
Police	\$ 31	\$ 46	\$ 98	\$ 169	\$ 190	\$ 534
Fire	73	92	197	338	380	1,080
General Utilities	126	183	395	676	759	2,139
Powerline Relocation	6,990	4,744	45,606	---	---	57,340
Elementary Schools	---	---	---	34,955	31,629	66,584
Secondary Schools	---	47,437	---	---	---	47,437
Housing Assistance	500	563	750	989	522	3,324
Land Acquisition	565	288	---	---	---	853
TOTALS	<u>\$8,285</u>	<u>\$53,353</u>	<u>\$47,046</u>	<u>\$37,127</u>	<u>\$33,480</u>	<u>\$179,291</u>

Several changes were made regarding land acquisition. First, no exchanges with the State Land Trust would occur unless a clear benefit to the District could be demonstrated. For purposes of these calculations, all land is assumed to be acquired through purchase by the District. Second, the acquisitions would be made over the first five years, rather than the first ten as previously assumed. Third, higher land acquisition costs were assumed in some cases. These higher costs are compared with previous assumptions in Table 38. The calculated costs were also inflated over the five-year acquisition period. These calculations are detailed in the Appendix. The results are included in Table 39.

**TABLE 37 Summary of Annual Operating Costs (Inflated)**

	Time Periods					(\$000)
	<u>1-5</u>	<u>6-10</u>	<u>11-15</u>	<u>16-20</u>	<u>21-25</u>	
Riverbed	\$ 105	\$ 326	\$ 9,655	\$15,771	\$21,608	
Riverbank	577	1,483	2,821	4,753	7,098	
Services	789	8,108	19,694	44,108	75,605	
TOTALS	<u>\$1,471</u>	<u>\$9,917</u>	<u>\$32,170</u>	<u>\$64,632</u>	<u>\$104,311</u>	

**TABLE 38 Land Acquisition Cost**

	(\$ per acre)	
	<u>Previous Cost</u>	<u>Adjusted Cost</u>
All Riverbed	\$20,000	\$ 20,000
Phoenix Riverbank	40,000	60,000
Phoenix Residential	---	150,000
Tempe Riverbank	60,000	100,000
Mesa Riverbank	50,000	80,000

Two additional changes were made to the original cost numbers. First, because of the acquisition of all of the land by the District, the land preparation costs must be increased to cover all of the privately-developed acreage. This was done by applying the previously used \$26,000 per acre cost to the entire 2,245 acres of private development between the parkways. These costs were also inflated. Second, because of the elimination of tax increment financing, the costs that would ordinarily be incurred by other agencies were deleted. Because the incremental tax revenues would accrue directly to these jurisdictions, they would have the resources to cover these costs.

A summary of all development costs is shown in Table 39. This table reflects the costs as adjusted for inflation, increased land acquisition and preparation costs, and deletion of other agency costs.

**TABLE 39 Summary of Development Costs (Inflated)**

		Time Periods			(\$000)	
Riverbed <u>1/</u>	\$ 16,129	\$ 12,216	\$572,469	\$ 91,323	\$ 275	\$ 692,412
Riverbank <u>2/</u>	19,757	26,434	59,197	84,229	79,112	268,729
Services <u>3/</u>	7,490	5,307	46,356	989	522	60,664
SUB TOTALS	<u>43,376</u>	<u>43,957</u>	<u>678,022</u>	<u>176,541</u>	<u>79,909</u>	<u>1,021,805</u>
Land Preparation	13,090	24,093	11,880	29,535	64,140	142,738
SUB TOTALS	<u>54,466</u>	<u>68,050</u>	<u>689,902</u>	<u>206,076</u>	<u>144,049</u>	<u>1,164,543</u>
Land acquisition	310,209	---	---	---	---	310,209
TOTALS	<u>\$366,675</u>	<u>\$ 68,050</u>	<u>\$689,902</u>	<u>\$206,076</u>	<u>\$144,049</u>	<u>\$1,474,752</u>

Notes:

1/ These are the totals from Table 34, less the land acquisition costs.

2/ These are the totals from Table 35, less the land acquisition and preparation costs.

3/ These are the totals from Table 36, less the other agency costs, which are police, fire, utilities, schools, and land acquisition for these facilities.

In order to determine the operating costs, the annual expenses shown in Table 37 were totalled for each five-year period and the other agency portion was deleted. The results are shown in Table 40.

**TABLE 40 Summary of Total Operating Costs (Inflated)**

	Time Periods					Total
	(\$000)					
	<u>1-5</u>	<u>6-10</u>	<u>11-15</u>	<u>16-20</u>	<u>21-25</u>	
Riverbed	\$ 525	\$ 1,630	\$ 48,275	\$ 78,855	\$108,040	\$ 237,325
Riverbank	2,885	7,415	14,105	23,765	35,490	83,660
Services	3,945	40,540	98,470	220,540	378,025	741,520
SUB TOTAL	<u>7,355</u>	<u>49,585</u>	<u>160,850</u>	<u>323,160</u>	<u>521,555</u>	<u>1,062,505</u>
Other Agencies <u>1/</u>	(1,206)	(35,544)	( 54,011)	(149,855)	(277,614)	(518,230)
TOTALS	<u>\$6,149</u>	<u>\$14,041</u>	<u>\$106,839</u>	<u>\$173,305</u>	<u>\$243,941</u>	<u>\$ 544,275</u>

Notes:

1/ The deleted other agency costs are all taken from the Services category and include police, fire, utilities, and schools.

**TABLE 41 Improved Land Values**

	(\$ per acre)	
	<u>Previous Value</u>	<u>Adjusted Value</u>
Industrial	\$160,000	\$160,000
Retail	261,360	240,000
Hotel	348,000	348,000
Residential	160,000	80,000
		(Low Density)
		(High Density)
Office	200,000	320,000
Commercial Recreation	160,000	50,000
Private Golf	160,000	20,000

Project Revenues

The funding approach uses three major sources of revenue. As in the earlier method, revenues are derived from land sales and land leases. Instead of tax increment financing, the third source is assumed to be an ad valorem property tax levy. In addition, this approach includes the sale of bonds as a means of acquiring the cash on a timely basis. Some income is also realized from the investment of the bond proceeds prior to their expenditure.

The calculation of land sales and lease revenues is somewhat different from the earlier approach. Different assumptions were used for the value of the improved land. These new values are compared in Table 41 with those used previously. The improved land values were calculated by applying these values to the proposed private development between parkways. The details of those calculations are shown in the Appendix. The result is a total first-year

value of \$74,980,000 for Phase I and \$283,340,000 for Phase II. These values are the basis for calculating the sale and lease revenues over the twenty-five year period.

**TABLE 42 Land Sales and Lease Revenues**

Year	% Becoming Available		Private Use Land Values		Value of Land Leased	Lease Income <u>1/</u>	Land Sales Revenue	Total Income
	Phase I	Phase II	Phase I	Phase II				
1	0.00%	0.00%	74,980,000	263,340,000	0	0	0	0
2	2.50%	0.00%	82,478,000	311,674,000	0	0	2,061,950	2,061,950
3	6.10%	0.00%	90,725,800	342,841,400	0	0	5,534,274	5,534,274
4	7.40%	0.00%	99,798,380	377,125,540	0	0	7,385,080	7,385,080
5	9.80%	0.00%	109,778,218	414,838,094	0	0	10,758,265	10,758,265
6	11.10%	0.00%	120,756,040	456,321,903	0	0	13,403,920	13,403,920
7	14.70%	0.00%	132,831,644	501,954,094	0	0	19,526,252	19,526,252
8	14.70%	0.00%	146,114,808	552,149,503	0	0	21,478,877	21,478,877
9	16.00%	0.00%	160,726,283	607,364,453	0	0	25,716,206	25,716,206
10	17.20%	0.00%	176,798,918	668,102,899	0	0	30,409,414	30,409,414
11	0.00%	6.80%		734,910,989	0	0	48,504,125	48,504,125
12	0.00%	7.00%		808,402,088	0	0	56,588,146	56,588,146
13	0.00%	7.50%		889,242,296	0	0	66,693,172	66,693,172
14	0.00%	8.50%		978,166,526	0	0	83,144,155	83,144,155
15	0.00%	10.30%		1,075,983,178	0	0	110,826,267	110,826,267
16	0.00%	11.30%		1,183,581,496	26,748,942	2,674,894	106,995,767	109,670,661
17	0.00%	9.40%		1,301,939,646	24,476,485	5,202,788	97,905,861	103,108,649
18	0.00%	8.50%		1,432,133,611	24,346,271	7,793,498	97,385,086	105,178,584
19	0.00%	7.50%		1,575,346,972	23,630,205	10,390,324	94,520,818	104,911,142
20	0.00%	5.60%		1,732,881,669	19,408,275	12,642,861	77,633,099	90,275,960
21	0.00%	4.70%		1,906,169,836	35,835,993	16,605,746	53,753,989	70,359,735
22	0.00%	4.20%		2,096,786,819	35,226,109	20,626,520	52,839,028	73,465,548
23	0.00%	3.30%		2,306,465,501	30,445,345	24,289,850	45,668,017	69,957,867
24	0.00%	3.30%		2,537,112,051	33,489,879	28,367,534	50,234,819	78,602,352
25	0.00%	3.30%		2,790,823,256	36,838,867	32,902,446	55,258,300	88,160,747
				TOTALS:	290,446,260	161,496,461	1,234,224,888	1,395,721,350

Notes:

1/ Lease income is calculated at 10% of land value when it becomes leasable and escalated 3% each year thereafter. Percentages of available land that is leased is as follows: Years 1 thru 5 - 0%, Years 6 thru 10 - 0%, Years 11 thru 20 - 20%, Years 21 thru 25 - 40%, Remaining land will be sold.

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Calculations of sales and lease revenues were made using the same rate of development as previously assumed. However, two other major changes were made. First, the annual land value increase is assumed to be ten percent rather than five percent. Second, a significant change is made in the ratio between sales and leases. It was concluded that an immediate leasing program is unrealistic because no market will exist before many of the public improvements are installed. It is not known at what point leasing will become feasible nor what the ultimate mix will be. For purposes of these calculations, it is assumed that all privately developed land will be sold for the first fifteen years. In years sixteen through twenty, 80% will be sold and 20% leased. In years twenty-

one to twenty-five, 60% will be sold and 40% leased. Lease income is calculated at 10% of land value when it becomes leasable and is escalated at 3% each year thereafter. Table 42 shows the results of the income calculations using these assumptions.

In addition to sales and lease income, revenue is derived from the application of an ad valorem tax on all real property in Maricopa County. The levy is assumed to be 25¢ per \$100 on the secondary assessed value in the county for the first twenty years and 5¢ for the five years thereafter. The sale of bonds is used to acquire the funds as they are needed over time. The revenues from land sales and leases and the property tax are used to repay the bonds--including principal and

interest.

Calculation of the revenue generated from the 25¢ tax is based on the assessed value in the county. The current assessed value is assumed to increase ten percent per year for the first ten years. The rate of increase then drops by one-quarter of one percent each year thereafter. Thus, the increase goes from 9.75 percent in the eleventh year to 6.25 percent in the twenty-fifth year.

The amounts that will be needed from bond sales have also been calculated for each year of the twenty-five year development period. The results of all calculations of revenues and expenses for each year are shown in Table 43. These figures are summarized in five-year increments in Table 44.

**TABLE 43 Summary of Annual Assessed Value, Income and Expenses (Inflated)**

YEAR ENDING JUNE 30	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
ASSESSED VALUE:												
AV INFLATION RATE=	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	9.75	9.50
ASSESSED VALUE	9,047,427	9,952,170	10,947,387	12,042,125	13,246,338	14,570,972	16,028,069	17,630,876	19,393,963	21,333,360	23,413,362	25,637,632
TAX RATE/\$100	25	25	25	25	25	25	25	25	25	25	25	25
INVESTMENTS EARNING RATE		8	8	8	8	8	8	8	8	8	8	8

RIO SALADO PROJECT - CASH FLOW ANALYSIS  
(IN THOUSANDS OF DOLLARS)

YEAR ENDING JUNE 30	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
INCOME:												
AD VALOREM TAX	22,619	24,880	27,368	30,105	33,116	36,427	40,070	44,077	48,485	53,333	58,533	64,094
LAND SALES AND LEASE	0	2,062	5,534	7,385	10,758	13,404	19,526	21,479	25,716	30,409	48,504	56,588
BOND PROCEEDS	51,165	55,155	57,940	62,725	66,205	0	0	0	0	0	77,615	71,080
INVESTMENT INCOME	0	0	0	0	0	0	0	0	0	0	0	0
PREVIOUS YEAR BAL.	0	4	0	0	4	2	2	1	2	3	2	0
TOTAL INCOME:	73,784	82,102	90,843	100,216	110,084	49,833	59,599	65,557	74,203	83,746	184,655	191,763
DEBT OUTSTANDING:	51,165	106,320	164,260	226,985	293,190	293,190	289,095	274,825	253,170	220,705	253,065	324,145
INTEREST RATE:	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
EXPENSES:												
LAND ACQUISITION	56,140	58,947	61,894	64,989	68,239							
DEVELOPMENTAL COST	11,293	11,293	11,293	11,294	11,294	13,609	13,610	13,610	13,610	13,610	137,980	137,980
OPERATING COST	1,230	1,230	1,230	1,230	1,230	2,808	2,808	2,808	2,808	2,808	21,368	21,368
DEBT SERVICE (PRIN)	0	0	0	0	0	4,095	14,270	21,655	32,465	45,255	0	0
DEBT SERVICE (INT)	5,116	10,632	16,426	22,698	29,319	29,319	28,909	27,482	25,317	22,070	25,306	32,414
TOTAL EXPENSES	73,779	82,102	90,843	100,211	110,082	49,831	59,598	65,556	74,200	83,744	184,654	191,762
YEAR END BALANCE:	4	0	0	4	2	2	1	2	3	2	0	0

(\$000)

1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
9.25	9.00	8.75	8.50	8.25	8.00	7.75	7.50	7.25	7.00	6.75	6.50	6.25	
28,009,112 25	30,529,933 25	33,201,302 25	36,023,412 25	38,995,344 25	42,114,971 25	45,378,882 25	48,782,298 5	52,319,014 5	55,981,345 5	59,760,086 5	63,644,492 5	67,622,273 5	
8	8	8	8	8	8	8	8	8	8	8	8	8	
1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	TOTALS
70,023	76,325	83,003	90,059	97,488	105,287	113,447	24,391	26,160	27,991	29,880	31,822	33,811	1,292,796
66,693	83,144	110,826	109,671	103,109	105,179	104,911	90,276	70,360	73,466	69,958	78,602	88,161	1,395,721
61,165	42,680	9,240	0	0	0	0	0	0	0	0	0	0	554,970
0	0	0	0	0	0	0	0	124	1,648	3,688	5,762	8,849	20,074
0	1	3	1	1	2	3	5	1,549	20,595	46,102	72,030	110,618	250,930
197,881	202,151	203,072	199,730	200,598	210,468	218,362	114,672	98,192	123,699	149,628	188,217	241,440	3,514,493
385,310	427,990	437,230	437,230	357,100	268,090	160,310	33,860	(0)	(0)	(0)	(0)	(0)	
10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	
137,981	137,981	137,981	41,215	41,215	41,215	41,215	41,216	28,809	28,809	28,810	28,810	29,810	310,209
21,368	21,368	21,368	34,661	34,661	34,661	34,661	34,661	48,788	48,788	48,788	48,788	48,788	1,164,543
0	0	0	80,130	89,010	107,780	126,450	33,860	(0)	(0)	(0)	(0)	(0)	544,275
38,531	42,799	43,723	43,723	35,710	26,809	16,031	3,386	(0)	(0)	(0)	(0)	(0)	554,970
197,880	202,148	203,072	199,729	200,596	210,465	218,357	113,123	77,597	77,597	77,598	77,598	77,598	525,723
1	3	1	1	2	3	5	1,549	20,595	46,102	72,030	110,618	163,842	3,099,720
													414,772

**TABLE 44 Summary of Income and Expenses (Inflated)**

	(\$000)					
FIVE YEAR PERIOD ENDING JUNE 30:	1990	1995	2000	2005	2010	TOTAL
<b>INCOME:</b>						
Ad Valorem Tax	138,089	222,393	351,978	430,673	149,664	1,292,796
Land Sales and Lease	25,740	110,535	365,756	513,145	380,546	1,395,721
Bond Proceeds	293,190	0	261,780	0	0	554,970
Investment Income	1	1	1	1	20,072	20,074
Previous Period Balance	0	2	2	1	1,549	
<b>TOTAL INCOME:</b>	<b>456,019</b>	<b>332,930</b>	<b>979,517</b>	<b>943,819</b>	<b>551,831</b>	<b>3,263,562</b>
<b>EXPENSES:</b>						
Land Acquisition	310,209	0	0	0	0	310,209
Developmental Cost	56,467	68,049	689,903	206,076	144,048	1,164,543
Operating Cost	6,149	14,041	106,839	173,305	243,941	544,275
Debt Service (PRIN)	0	117,740	0	437,230	(0)	554,970
Debt Service (INT)	84,192	133,098	182,774	125,659	(0)	525,723
<b>TOTAL EXPENSES:</b>	<b>457,017</b>	<b>332,928</b>	<b>979,516</b>	<b>942,270</b>	<b>387,989</b>	<b>3,099,720</b>
<b>PERIOD ENDING BALANCE:</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1,549</b>	<b>163,842</b>	

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## FUNDING STRATEGY

After evaluation of the two basic approaches to implementing the project, the Board of Directors has determined that funding approach No. 2 will constitute the policy of the District.

In summary then, the strategy for funding the public costs of the Rio Salado project will include the following items:

1. Seek the authority to levy an ad valorem tax not to exceed 25¢ per \$100 on the secondary assessed valuation of property in Maricopa County.
2. Seek authority to issue general obligation bonds in an amount not to exceed 3% of the total secondary assessed valuation in Maricopa County.
3. Using the revenues from the initial bond sales, acquire all land needed for the project as soon as

possible through cash purchase. Supplement the cash acquisitions through the use of exchanges with the State Land Trust when a clear benefit can be demonstrated.

4. After land acquisition, maximize District income through immediate lease-back of properties to users until the land is needed for redevelopment in accordance with the Master Plan.
5. Begin the construction of the public improvements using funds from the sale of bonds. As the private development occurs, institute a program of land sales and leases to the private developers. Determine the appropriate mix of sales and leases according to the existing market.
6. Consider tax increment financing as a possible long-term strategy. Evaluate the need for this

device as the project evolves. If determined to be needed, seek the required constitutional amendment.

# Acquisition and Construction

## ACQUISITION

Although new development anticipated in the first 25 years is expected to extend from the riverbed to sites as far as three-fourths of a mile from the river, only that land which lies within the parkways would actually be acquired by either the Development District or the State Land Trust. Under Funding Approach No. 1, the Development District would purchase about 60% of the land needed between the parkways and the State Land Trust would acquire about 40%. Under Funding Approach No. 2, the District would acquire 100% of the needed land.

About 30% of the land slated for development within the parkways, outside the indian community, is already owned by public entities such as the Bureau of Land Management, the Salt River Project, and the various city governments. The 1300 acres of land which is proposed for a public use, such as portions of the riverbed park, would not require

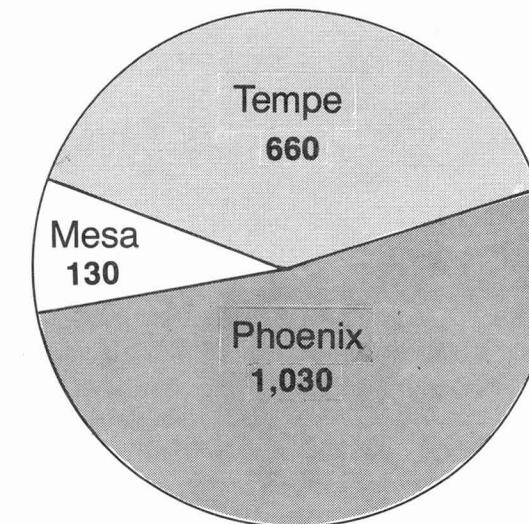
purchase, but agreements with these agencies would be necessary to insure that the future use is compatible with the plan. Publicly-owned land (520 acres) which is designated for private development would be acquired by the District. Some agencies may desire to trade land in the project area for sites elsewhere, appropriate for a new landfill or other public use.

Current public ownership is shown in Table 45. All land within the Salt River Pima-Maricopa Indian Community, of course, would remain under the ownership and control of the Tribal Council.

When a clear benefit to the District exists, land may be acquired through exchanges between the private owners in the area and the State Land Trust. The State Land Trust holds and leases land throughout the State to generate income to help support various State functions. They are able to trade land with little leasing value for land that has more potential. Along the

TABLE 45 Publicly Owned Land Within Parkways

(estimate)	
Location	Acres <sup>1/</sup>
Phoenix	1,030
Tempe	660
Mesa	130
Total	1,820



<sup>1/</sup> This does not include publicly owned land which will continue in its current use such as the existing sewage treatment sites.

Rio, some sand and gravel operators may be very interested in trading their holdings that have been mined out for State Land with sand and gravel reserves located elsewhere. The State would gain by preparing the mined out site for lease.

There will, of course, be some owners who will not wish to sell or trade their holdings. If this plan is to work, each municipality and the County must be committed to allow the District to use its power of eminent domain in situations where every fair offer has been rejected by the current owner. The willingness to use these legal means may be particularly important for key Phase I sites in Phoenix, Tempe or in the County east of Scottsdale Road.

All acquisitions by the Development District should be made during the first five years of the project. Land values will remain relatively low during that period since upstream flood control will not be in place. Delaying in purchases

**TABLE 46 Land to be Acquired (Funding Approach No. 1)**

Ultimate Use	(acres)							
	Phoenix		Tempe		Mesa		TOTAL	
	RSDD	SLT	RSDD	SLT	RSDD	SLT	RSDD	SLT
Riverbank-Public	333	222	87	58	12	8	432	288
Parkways	123	82	54	36	42	28	219	146
Private Development	807	538	309	206	231	154	1,347	898
Riverbed	<u>594</u>	<u>396</u>	<u>324</u>	<u>216</u>	<u>162</u>	<u>108</u>	<u>1,080</u>	<u>720</u>
Total	1,857	1,238	774	516	447	298	3,078	2,052

may cause the cost of acquisition to increase to levels that will threaten the feasibility of the project.

Figure 49 shows the general area to be acquired. Table 46 gives the acreages that would be acquired by the District and the State Land Trust under Funding Approach No. 1. The total acreage to be purchased by the District under Funding

Approach No. 2 is shown in Table 47.

**TABLE 47 Land to be Acquired by RSDD (Funding Approach No. 2)**

<u>Ultimate Use</u>	(acres)			<u>TOTAL</u>
	<u>Phoenix</u>	<u>Tempe</u>	<u>Mesa</u>	
Riverbank - Public	555	145	20	720
Parkways	205	90	70	365
Private Development	1,345	515	385	2,245
Riverbed	990	540	270	1,800
TOTAL	3,095	1,290	745	5,130

## CONSTRUCTION

The construction of the riverbed park will begin slowly, focusing only upon those actions which are critical to the success of Phase I areas. During the first ten years, Indian Bend Wash will be completed; a lake, vulnerable in heavy floods, will be built at Central Avenue to create the exposition site; and a portion of the waterway, also vulnerable in floods, will be built in Tempe.

Once the new upstream flood control devices are in place at year ten, full construction of the riverbed will proceed rapidly, beginning with the sedimentation basin in the Indian Community and working its way downstream. The grass channel will be planted along the way to prevent sediment from small floods or run-offs from spoiling the waterbodies.

The bulk of the riverbed park construction to 7th Avenue should occur between years eleven and sixteen, with the most westward portion completed shortly thereafter. The Development District would have the full responsibility for the construction of this park.

On the banks, public projects and other site preparation would occur, during years one through ten, only at the two Phase I sites and at locations which are likely to develop early based on current developer interest. Site preparation and public improvements for the balance of the development have been phased over the 25 year period to proceed as fast as would seem feasible

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from a market perspective. Sites where low density housing is projected, for example, would be serviced and sold late in the 25 year schedule, after the riverbed is complete and significant changes have occurred on the banks. Only then is the marketability of this housing deemed feasible.

Equestrian centers are suggested for early implementation because of the demand, and because portions of the riverbed can easily be used for riding. Replacement housing is needed early in order that families will be provided for, who have been displaced by such public action as the construction of parkways. The details of the scheduling and phasing of construction activities are shown in the cost tables in the Appendix.

Construction responsibilities would be varied on the banks. The cities might be encouraged to initiate projects such as the parkways, bridges, golf courses, equestrian centers, fire stations and some water features like the new lakes at Central Avenue. Later, more detailed plans will determine these responsibilities. The cost for these public developments would be met by a sharing of project revenues as described in the Financing section.

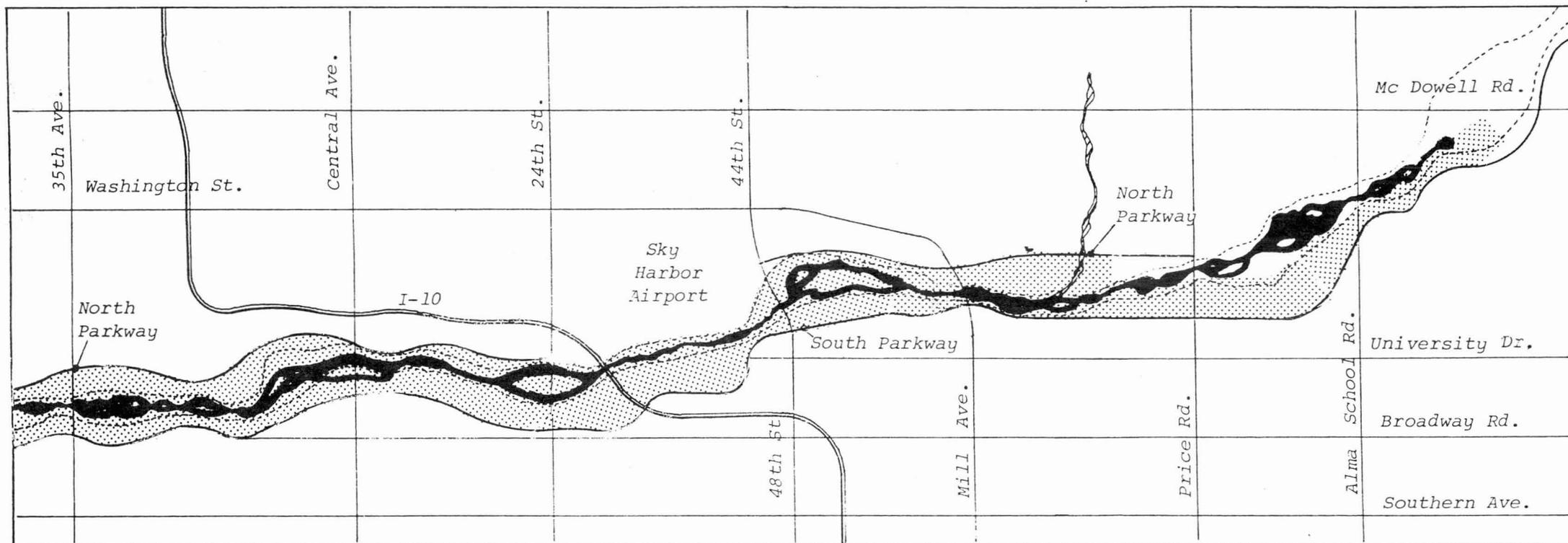
The Development District would be responsible for the construction of parks and open spaces, new low income housing and public improvements in neighborhoods designated for revitalization. The Development District and State Land Trust would be responsible for

site improvements necessary for the lease or resale of land slated for private development within the parkways. Outside the parkways, new development would be achieved mainly through private initiative.

Some special sites will require the participation of many public and private interests, as has been common in the preparation of most expositions around the country. At Central Avenue, for example, the Development District might construct the riverbed lake and prepare the island for development; the City might build the lake on the south bank, the Southwest Cultural Center and ethnic marketplace, "Discovery Place," and the water museum; the State might work together with the local school district and private companies to con-

struct the high-tech alternative school; and, a public-private, non-profit body would see that the temporary exposition pavillions were built.

FIGURE 49 Land Acquisition Areas



 Land Acquisition Areas

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# Operations and Maintenance

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In general, this plan proposes that the District be responsible for overseeing and funding the operations and maintenance of much of the entire Rio Salado project, while contracting out many detailed functions and tasks to other agencies or companies. This means that the District could operate with minimal staff, and not become a large bureaucracy.

Thus, the District should bear the overall responsibility of operating and maintaining the regional park system. It would develop and coordinate the programming for the parks, while actual maintenance would be accomplished by the cities, or by private firms capable of handling such a task. Every effort should be made to employ residents of the District to do the actual work. Some contractual arrangement would also be required, between the Development District and the State Land Trust, so that maintenance of the total park system would be consistent and unified.

However, some elements of the regional park will probably become the responsibility of the cities. The equestrian centers, the municipal golf courses, and certain islands could be operated and maintained by a city recreation staff. Some islands might also be taken over by special non-profit organizations, for programming and caretaking.

The District would also be responsible for acquiring, maintaining, and leasing or selling most of the parcels between the parkways which are designated for private use. Again, some of these functions, such as leasing and property maintenance, might be contracted out to private companies, but District staff would need to oversee this process. The District might also enter into a master lease with the State Land Trust and coordinate private development through sub-leases.

Although the District should commit itself to funding the

construction of replacement housing for displaced families, the work of supervising its construction and managing the finished units should be contracted out to organizations experienced in such matters. It may be that several different entities will be needed to handle the different types of rental, re-sale, or cooperative housing. Organizations with successful track records within the Phoenix area should be sought first. Where the expertise cannot be secured locally, however, it may be necessary to contract with organizations in other cities. Some of these outside groups are mentioned in the Social Element. A similar arrangement would apply for housing assistance programs.

While the District will assume the financial burden of constructing public improvements in existing residential neighborhoods identified for rehabilitation, the City of Phoenix should maintain them. Other items should be the sole re-

sponsibility of the cities, from construction through long term operation and maintenance. These items include the parkways, bridges, utilities, solid waste management, and the provision of police and fire protection.

Finally, the operation and maintenance of all schools would continue to be the responsibility of the affected school districts. The funds to pay the additional costs traceable to the Rio Salado would be worked out through a share of tax increment funds, as described in more detail in the Financial Strategy section.

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# Control Over Development

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The Rio Salado Plan will be carried out over many years through thousands of decisions to build facilities and develop sites. The plan will provide general guidance on uses and environmental character, but on large development parcels--especially the lands adjacent to the recreation spine--more detailed area plans will be needed. These should specify quite precisely the desirable mix and intensity of uses, the height and bulk of building, the type of landscaping, the access routes to each development, and the relationships of public areas to areas developed privately. There will be constant pressures to do without such detailed plans, and to neglect them when they have been drawn, in the interest of seizing what seem to be fleeting opportunities. But neglecting the larger context denies the essential nature of the Rio Salado District: the chance to demonstrate how a planned ensemble of buildings and landscapes can create a unique place for all the residents of the Phoenix area.

The development control system can help ensure that all projects are evaluated for permits in light of the Rio Salado Plan. Development control is traditionally a local government prerogative. In each of the communities in the District, a somewhat different system of regulating the use of sites has evolved, and each local area has tended to emphasize different aspects of development in their regulations. In the Rio Salado District, methods of regulating development will have to be custom-tailored to fit each local system while reflecting the intentions of the plan. While the details will vary from community to community, the approach should be based on four principles:

- 1) Lands which are adjacent to the parkways or the central spine of recreation facilities as well as large underdeveloped blocks should be subject to the most stringent requirements, and receive the greatest scrutiny during development permitting.

- 2) Control over interim uses is essential. Since many areas are slated for uses that differ from current ones, proposals to expand or extend existing uses must be weighed against long term interests.
- 3) The development control system should allow proposals which meet the Plan to be approved quickly, preferably through a one-stop process.
- 4) The District must be assured that the types and intensities of use shown in the plan will not subsequently be modified through local development controls to lower yielding development. Without such assurance, it will have difficulty marketing bonds or other indebtedness which depend for repayment upon revenue from new development.

Thus, development controls are a two-edged sword:

Local governments need to be assured that they retain final approval responsibility and that all new projects will meet or exceed their standards; and the District needs the assurance that the timing and magnitude of development essential to repay its investments will remain possible throughout the life of the project, and that the Plan will be accounted for in all local decisions. The development control system will require agreements among all jurisdictions well in advance of the first major development proposals.

## INTERIM CONTROLS

In the areas subject to flooding, it is unlikely that major investments will be proposed prior to the construction of the upstream dams, although large property owners may (as they are now doing) propose the construction of levees to allow lands to be reclaimed. Some additional open storage or other wasteland uses may,

however, be proposed in areas where these now predominate. There may be proposals to extend current uses in areas beyond the flood zone, where the Plan purposes a shift to other uses. Each of these cases will require interim controls which minimize economic hardship while not foreclosing the possibility of eventually accomplishing the Rio Salado Plan.

Four steps are essential to provide interim control over uses within the District:

1) Any changes which require permits under flood plain ordinances should be evaluated in terms of the Rio Salado Plan and should be referred to the District for comments, recommendations and proposed conditions. Where changes to contours or drainage ways (levees or dredging) are proposed, these should be required to conform to the ultimate lines of the plan. Use permits within the flood plain should be restricted

to 5 years to allow flexibility in the timing of District improvements. Additional legislation may be needed in order to impose these requirements.

2) The Rio Salado District should be given the responsibility for monitoring and ensuring compliance by all parties holding special permits for uses in the flood plain. This will assist local governments in the interim management of this area.

3) All rezoning petitions and petitions for uses requiring special permits (beyond permits for flood control areas) should be referred to the District for comments and recommendations. Where these do not conform to the Rio Salado Plan, they should be denied, or granted only for a limited period if the lands are not critical to immediate development.

4) Service limit lines should be established to preclude

sewer and water hookups between the parkways and on other large development sites in the District prior to approval of a detailed area plan that conforms to the overall Rio Salado Plan. This step will provide a powerful control over the timing of development as well as its form.

## DEVELOPMENT CONTROLS FOR LARGE PARCELS

Land within the parkways, as well as other larger undeveloped sites beyond them, should be designated as planned development districts under current zoning provisions of the local governments. This will allow areas to be developed comprehensively, according to a detailed plan for each development area. Since most of this land is slated for public acquisition, the District will have the responsibility of preparing detailed plans and negotiating with local planning commissions about the conditions that will apply to developers when lands are sub-

sequently leased or resold. When these have been agreed upon, developments which conform to the plan should be able to be permitted expeditiously, with only final site plan approval required.

## ZONING OF PERIPHERAL SITES

In several areas beyond the parkways, the plan proposes a shift in use from industrial to residences or offices. In some of these cases, especially where there is much open land available for development, it is desirable to change the zoning to reflect the proposed new uses. However, in largely built-up areas it may be more appropriate to consider use changes on a case-by-case basis via rezoning petitions, referring these to the District for comments before action is taken.

## DESIGN REVIEW

Conventional development controls are too coarse an in-

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strument to ensure that public and private construction is of the highest standard of design. That requires case-by-case review by an impartial group who collectively reflect community aspirations for environmental character.

Through modifications to the State legislation which established the Rio Salado District, a Rio Salado Design Review Commission should be created. Its members should be appointed partly by the District Board and partly by the local governments, and should include respected professionals with expertise in architecture, landscape architecture, engineering, planning and development, as well as several lay representatives. The Design Review Commission should have the power to review and approve or deny any private building project within the District, except single family residences and minor alterations to existing structures which would be exempt from review.

Application for building permits would be referred to the Design Review Commission by local permit agencies. Proponents who were denied approval and felt this was unjust should be able to appeal to their local government council to overrule this outcome.

Review of all public construction and landscape projects should also be required if they are within the District. Any appeals to Design Review Commission rulings would be heard by the Rio Salado District Board.

Design review processes are inevitably contentious and can become an irritant to proponents who believe that design is largely a matter of taste not logic. Yet the best urban development projects have used design review procedures as an important element of their development control procedures. Experience has shown that design review is most successful where there is strong backup staff to work with proponents from the earliest stages of a project. The staff can offer

guidance to proponents on what will likely be considered acceptable, can screen out the worst schemes before they reach the Commission, and can probe for compromises when Commission and proponents seem at loggerheads. The Rio Salado Development District is the logical organization to provide staff to this process.

## **ONGOING REVIEW OF DEVELOPMENT CONTROLS**

Throughout the long development period, it will be important that staff of the District keep in contact with their counterparts in local government. They ought to meet regularly to discuss development control issues and to air any frustrations over perceptions that uneven demands are being placed on each of their localities. At least once a year a major review should be made of how well the controls are functioning. While each local government will retain ultimate control over development

within its boundaries, it is important that objectives be commonly held and that other bodies be invited to suggest how development regulation may be improved.

In addition to the review of development controls, the District will maintain continuing coordination with local governments on all aspects of the project. This coordination will exist with the local planning staffs and all appropriate citizen advisory committees. In this way, consistency among the various plans can be assured.

## **ISSUES SPECIFIC TO LOCAL GOVERNMENTS**

As we have noted, this general approach will need to be fine-tuned by each local government to correspond to its ways of dealing with development controls.

### Phoenix

Most of the land in central Phoenix within the river corridor is currently zoned for A-1 Light Industrial or A-2 Heavy Industrial uses. Virtually all uses are permitted in the A-2 district, and the A-1 district is only slightly more restrictive. Sand and gravel operations require a special permit in both districts, but the code imposes few restrictions or conditions on such operations. Residential uses also require a special permit in each district. The logical step in implementing the approach outlined above would be to create a series of Planned Community (PC) districts following the planned divisions of the area between the parkways. Establishing a PC district allows detailed plans to be approved for each development unit within the broad outlines of the overall plan. Where resort development is proposed, the Resort District (RH) variation of the planned development category may be more appropriate.

The City of Phoenix will also need to adjust its zoning in several areas beyond the parkways to encourage the transition from mixed industrial-commercial to residential development. Without the assurance that an area will, over time, shift to a predominantly residential area there is little incentive for new houses or apartments to be built there. The rezoning should be done selectively, principally to aid those areas where new development corresponding to the plan is likely to be deterred by inappropriate use zoning.

If the Design Review Commission we note above is created, it will not be critical that a detailed riverfront overlay zone be enacted, as has been discussed in the past. However, the City would be well served to insist routinely upon site and landscape review of all projects in the Rio Salado area as a condition on special permits, zoning changes or variances.

### Tempe

The City recently enacted a riverfront overlay zone which provides for special control over the form and character of all development adjacent to the Rio Salado. This is in line with the City's strong tradition of detailed development control. The overlay does not, however, control the uses within the District, which currently are a broad mixture including R1-6 One Family Residence, I-1 Light Industrial, I-2 General Industrial, I-3 Heavy Industrial, R-3 Multi-family Limited, and PCC-1 Planned Commercial Center uses. Ultimately this pattern should be adjusted to reflect the Rio Salado Plan. Within the parkways, the District or State Land Trust can apply for Planned Area Development (PAD) designation to provide the flexibility and control required to carry out the plan.

### Mesa

Roughly 80 percent of the land area in the Mesa portion of

the District adjacent to the riverbed on which new development is envisioned to occur over the next 25 years is projected to be low density residential. Given the simplicity of the projected future development and the local land use control system, we propose a simple adjustment of Mesa's zoning to fit the new use categories shown on the plan.

### Maricopa County

Many "County Islands" were formed prior to the 1982 changes in Arizona State annexation laws. Some were formed where less desirable areas were excluded from large annexations. This is especially a problem in the "County island" surrounded by Tempe, which is slated for key development, and in the area between 27th and 35th Avenues, which is designated for resorts and new housing development. These sites are critical areas for early purchase by the District so that they can be amalgamated with adjacent localities, and

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can provide the land for important new developments. Beyond this, it is especially important that the District continue to work with the County in enforcing existing County regulations and in developing new techniques for land use planning and implementation.

## AIRPORT SAFETY STANDARDS

Another development control issue is concerned with assuring safety from any hazards associated with airport operation. As detailed plans are prepared and individual projects designed, aircraft accident potential will be analyzed. Recommendations will be made to insure that the developments are compatible with the defined risk to persons and property on the ground.

## OTHER APPROACHES

In the course of preparing the plan, a variety of other ap-

proaches to regulation were examined, but rejected. One of these, the transfer of development rights, is potentially a technique for reducing the cost of acquisition of lands in the river corridor. With this method, current owners of land designated for recreation or other open uses would be permitted to transfer their "rights" to develop to other sites, or sell these "rights" to others. But there are two problems which make such a transfer scheme infeasible: the restrictiveness of state enabling legislation for zoning, and the large unused capacity for development under current zoning which means there is little need or incentive for developers to acquire the rights to develop at higher intensities. Other more modest density transfers can be negotiated within the boundaries of large sites under the planned development area approach we propose be used.

Mandatory resubdivision is a highly useful technique that is worth considering further, but would require enabling legislation. It would complement the regulatory tools now available. With resubdivision powers available, the majority owners of a defined area of land could apply to the local jurisdiction to have their land amalgamated with their neighbors and then re-subdivided in a planned manner. Each owner would receive, as compensation, their share of the resubdivided development sites, after areas had been set aside for roads, recreation area and flood protection zones. This technique can be extremely useful for replanning areas where the ownership patterns are a deterrent to sound development. (Indeed, it was first used by cities to replot undeveloped "paper subdivisions" that were the legacy of land development booms in the 1920s.) Giving local govern-

ments resubdivision rights would require new state enabling legislation to be passed. But it could have uses in many developing areas of Arizona well beyond the Rio Salado District and would certainly be an aid to this project.

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# Legislative Action

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Several legislative actions will be needed in order to implement the proposed Rio Salado development. The immediate needs are concerned with the financing of the project. The following specifications are proposed.

## Property Tax Levy

The cornerstone of the initial financing strategy is a tax levy on property in Maricopa County. As has been discussed in other sections of the plan, such a tax has been determined to be the most effective and equitable method of beginning the project. New tax revenues --property, sales and income-- that will be generated by the project will benefit all taxpayers in Maricopa County. More new tax revenues will be generated from the project than will be collected by the District from its 25¢ levy during its twenty-five year life.

An act of the Legislature is needed that will grant to the District the authority to levy

a property tax not to exceed 25¢ per \$100 on the secondary assessed value of Maricopa County.

## Bonding Authority

The second major component of the financing strategy is the ability to issue bonds to acquire the needed cash on a timely basis. The principal need in the early years will be for relatively large amounts of capital for land acquisition. This requires an act by the legislature to allow the District to issue General Obligation Bonds. Such issues would be made only after the approval of the voters of the County. The bonds would be limited in amount to a maximum of three percent of the total secondary assessed valuation of Maricopa County.

## Adjustments to Rio Salado Enabling Act

Other amendments to the existing Rio Salado statutes will be needed. Minor revisions and additions will be needed

to clarify the District authority to conduct all of the necessary activities. More importantly, certain constitutional provisions will require revising the existing law to a more general enabling statute in order to permit the granting of taxing and bonding authority.

## Possible Future Needs

Other legislative actions may be needed in the future. This would occur if tax increment financing is determined to be needed as a long-term funding mechanism. Existing constitutional restrictions make the use of this technique impossible. Thus, a constitutional amendment would be required. A proposal would be made to the Legislature to approve a referendum to place the amendment on a general election ballot. This referendum would set general parameters for the use of tax increment financing and would empower the Legislature to define more specific procedures and limitations. If the amendment were approved by the voters, more specific

implementing legislation would then be needed in order to enable its use by the District.

Amendments to the existing laws that regulate the State Land Trust may also be needed if exchanges with the Trust are to be used as a means of land acquisition. These changes would be concerned with the existing restrictions on exchanges across county boundaries, the simplification of certain procedural details, and the funding of additional staffing for the State Land Department in order to facilitate the exchanges. An amendment may also be needed to facilitate the planning and development of the Trust lands, specifically within the Rio Salado Development District.