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COMMITTEE REPORT

ARIZONA CANAL/ACDC REACHES 3 & 4

JOINT RIGHT-OF-WAY USE STUDY

David Burris, Chair
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October 16, 1987

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PURPOSE

This report is an assessment to the issues associated with reconfiguring portions of the Arizona Canal (Canal) and the Arizona Canal Diversion Channel (ACDC) to increase the multiple use potential of the combined right-of-way. The issues involved have been evaluated to assess their effect on the existing ACDC construction schedule, local and federal funding requirements, potential community benefits, operations and maintenance.

INTRODUCTION

The Canal and the ACDC parallel each other from approximately 40th Street to 75th Avenue. Although the rights-of-way are contiguous, the facilities are independent and separated by a shared maintenance road that doubles as a hiking and riding trail. Thus, the potential for multi-purpose use is limited for either facility. This report examines the issues associated with combining the two rights-of-way to permit development of water-oriented recreational and/or commercial facilities which will maximize public use and encourage private development along those reaches of the ACDC not yet constructed.

BACKGROUND

The Canal is designed to deliver irrigation water to SRP water users as it traverses the Valley from east to west and therefore, becomes smaller as it proceeds across the Valley. Flood waters originating in the areas north of the Canal have historically been impounded by the Canal embankment and/or flowed into the Canal. To the extent possible, storm flows were delivered as "free water" to SRP lands. Urbanization has increased the frequency and amount of storm water delivered to the Canal and reduced the potential for disposal by delivery. As a result, when the operating capacity of the Canal is exceeded, water exits through spillways in the Canal banks and on occasion overtops or breaches the Canal, resulting in flooding of urban areas.

The Corps of Engineers (Corps) was asked to investigate this and other flooding problems in the Phoenix area. After several years of study, a plan was developed by the Corps and accepted by the community. One feature of the approved plan is a flood channel immediately north of the Canal to intercept storm water and convey it west for disposal in Skunk Creek. This flood channel is known as the ACDC. In addition to providing flood protection to the urban area and the Canal, it will serve as an outlet for storm sewers and intercept silt and sediment presently deposited in the Canal.

Reaches 1 and 2 of the ACDC have already been constructed or are in the construction process. Reach 1, through the City of Glendale, consists of a broad earthen channel which ultimately will contain parks and recreation facilities. Reach 2 begins at 53rd Avenue and extends eastward to 21st Avenue. It will be a concrete lined channel with limited public access. Reach 3 begins at 21st Avenue and, as planned, will consist of a rectangular concrete channel of varying widths extending to about 11th Street. From there, the rectangular cross section will continue to the end of Reach 4 at 40th Street.

During the planning and design of the ACDC, efforts were made to combine the facilities. These efforts were dropped because of the incompatibility of purposes.

Reach 3 is presently under design and is scheduled to be advertised for construction bids in August 1988. The design contract for Reach 4 will be let in July 1988 with construction advertisement in November 1989. Completion of construction on Reach 3 is scheduled for March 1990 and Reach 4 in September 1991.

APPROACH

In September, a committee composed of representatives of the Salt River Project, the Flood Control District of Maricopa County, and the City of Phoenix was appointed to examine the issues and opportunities of combining the rights-of-way. Assistance and advice was obtained from the Corps in those areas dealing with design, funding and construction of the existing project. Technical support was provided by the consulting firm of Howard Needles Tammen and Bergendoff.

In evaluating possible alternate concepts, a series of key issues were developed. Each was analyzed to determine the severity of impact and whether or not immediate resolution is necessary. The principal issues were: Impact on the ACDC, Local Funding, Economic Benefits, Community Benefits, and Plan-Specific Issues such as safety, operation and maintenance, water use, constructibility, etc..

A summary of the primary issues associated with each alternate is presented in Appendix A. The issues and an indication of the need for immediate resolution of each are displayed for easy reference.

DESCRIPTION OF ALTERNATES

Alternate A is shown on Plate 1 and depicts the Canal and the ACDC located immediately adjacent to each other but separated by a concrete wall. The ACDC would be filled with water to provide a large surface area capable of accommodating boating or water-related uses. Side channels or inlets could be developed as further enhancement.

Alternate B is shown on Plate 2. It would relocate the Canal into two conduits buried next to the ACDC which would be constructed as a wide shallow channel with terraces to accommodate landscaping and recreational facilities. Various water features could be constructed in over-excavated areas in the bottom of the channel so as not to affect the conveyance of flood waters.

Alternate C is shown on Plate 3 and consists of covering all of the ACDC in its planned location and developing the Canal as the principal water feature.

DISCUSSION OF ISSUES

The most serious issue is the impact on the ACDC schedule. Any deviation from the presently approved plan will require in-depth study by the Corps of Engineers to determine technical adequacy and cost implications. A request to the Corps to analyze a combined use concept would stop the present design contracts for Reach 3. It is estimated that 1 to 4 years, depending upon citizen involvement and the alternate selected, would be required to complete the study and advertise for construction bids.

In addition to the delay estimated above, the possibility exists that the federal funding priority will slip as a result of the delay.

The Corps may determine that any alternate to the present plan will require reformulation of the project. Although this does not appear likely, the possibility exists. Reformulation would require the use of higher discount rates to determine economic feasibility and would probably result in an unfavorable benefit-cost ratio and deauthorization of the project.

All of the alternates considered here will significantly increase the local cost share of the project from those presently planned. However, the Corps will probably contribute most of the presently estimated flood control construction funds toward a new concept. The anticipated funding responsibilities are shown in Appendix B.

Federal rules require local sponsors to provide all necessary right-of-way and utility relocations. Utilities are defined to include roads, bridges, water, sewer, telephone, electric, gas, canal and other irrigation facilities, etc..

Alternates A and B require the Canal to be relocated. The presently planned utility relocations would have to be lengthened to accommodate the wider section. Nine bridges would have to be lengthened and some utility relocations that are under construction would have to be redesigned and replaced.

The demand for recreation facilities and open space is increasing with the Valley population. Picnic, hiking and riding, bicycling, fishing and pleasant open space facilities are leading this increased demand. The attraction of the Canal right-of-way as a trail system corridor is being impacted by the ACDC. The

concrete channel will be an asset neither to recreation nor to the adjacent neighborhoods. It tends to increase the physical and psychological barrier to the community which the Canal now represents.

For many reasons the Committee anticipates that new commercial development will not be possible or appropriate along the entire length of Reaches 3 and 4. The area of best potential appears to line between 21st Avenue and 12th Street which includes the Central corridor. The possible future relocation and extension of Hatcher Road to provide a direct connection between Metro Center and the Sunnyslope Village may permit acquisition of significant tracts of land which would increase the potential for the commercial redevelopment of this area. This redevelopment should be concentrated at major street intersections and these nodes connected with less dense recreational facilities.

The second area with significant commercial development potential is west of the Biltmore Resort at approximately 22nd Street. Available access, proximity to existing parks and the Biltmore Resort, and the possible availability of other lands indicates the likelihood of successful redevelopment.

The presence of recreational facilities in the downstream reaches of the ACDC will require advance warning of any releases of water stored for recreational or aesthetic purposes in anticipation of storm events. This is considered a major issue for Alternate A that will be difficult to resolve.

In addition to the downstream safety issue, improved access and limited restrictions on the water features will increase the liability potential along the project. The severity of these issues vary with each alternate and should be a major factor in selection of an alternate.

All of the alternates considered would require an operating agency. The duties and responsibilities of this agency will vary with the alternate selected and the amount and type of development permitted. Operation, public safety, and maintenance will be the primary concerns. Dividing these duties among the City, SRP, and the Flood Control District may be possible. The selected alternate and federal regulations will probably dictate the organizational structure required and assignment of responsibilities.

Each alternate will require changes in SRP maintenance practices. Cleaning and de-mossing the Canal may require new equipment and procedures. The selected alternate will dictate the nature and extent of the changes necessary. This is not considered a major problem.

Those alternates that would relocate the Canal will increase velocities and decrease system storage by 40 to 60 percent. This will require development of new operating criteria, physical improvements to the distribution system and may result in a less responsive and flexible system.

Although the existing Canal right-of-way is within the Salt River Reservoir District boundary, it has no water right of its own. Consequently, any consumptive use of a water feature would have to be replaced from a non-SRP source.

Water quality standards appropriate to the designed use will have to be observed. Provisions for maintaining the appropriate standards can be facilitated during the design process. No unusual problems are anticipated.

The present Canal configuration typically provides a 50 foot right-of-way on either side of the Canal for maintenance roads, power lines and other utility functions. It has great potential for additional future use, since right of way for overhead power lines is virtually impossible to obtain in urban areas. Utilization of the Canal right of way for other features would prohibit, or greatly restrict, such future use. Considered an issue which can be resolved, it is identified so that agreements with respect to land rights and uses can be resolved.

Ownership of the Canal right-of-way typically resides with the federal government. Therefore, prior to any commitments of right-of-way use, agreement must be obtained from the Bureau of Reclamation.

A continuous water supply to SRP's water users must be maintained during construction. Each alternate will have different problems that can be solved.

DISCUSSION OF ALTERNATES

None of the Alternates were considered feasible to construct for the entire length of Reach 3 and 4 because of previous commitments to cover the ACDC in areas of limited right-of-way. These areas are adjacent to the Sunnyslope High School, the Biltmore Resort, and a portion of the ACDC in the Town of Paradise Valley. The present plan provides for covering the ACDC for approximately half of the distance between 24th Street and 40th Street. Because of these previous commitments and anticipated resistance to an open channel from the Biltmore Resort and the Town of Paradise Valley, only limited additional benefits could be derived east of 24th Street. consequently the alternates were considered to be viable only between 21st Avenue and 24th Street.

Alternate A

Alternate A has several serious disadvantages. The first would be gaining approval of the Corps and the Flood Control District to fill the ACDC with water. The physical problems of containing the water and maintaining its quality could be solved during the design process. However, before the ACDC could carry flood water, it would have to be emptied. This poses several safety and liability problems in the existing downstream recreation facilities as well as along the ACDC itself. Preliminary information from the Corps

and the Flood Control District is that approval would be extremely difficult if not impossible to obtain because it is not considered to provide a "fail safe" service level.

The Alternate would also require water for subsequent re-filling and to compensate for increased evaporation. The water emptied in anticipation of a flood event or other consumptive uses would have to be repaid from non-SRP sources.

The Canal gradient would raise significantly above the water in the ACDC. The separating wall would therefore be a visible eyesore restricting access for maintenance and/or recreation.

Obtaining the necessary approvals, safety and liability issues, and increased water consumption are major problems that can be eliminated or greatly reduced with other alternates. Therefore, Alternate A was dropped from further consideration without developing any cost estimates or additional data.

Alternate B

Alternate B eliminates most of the problems associated with A. The anticipated water feature would be relatively shallow and would not have to be emptied prior to storm flows. This would simplify the Corps and Flood Control District involvement in operations and would minimize downstream liability issues.

Placing the Canal in conduits, although detrimental to Canal operations, would permit public access to both sides of the ACDC and increase future development possibilities. Facilities could be developed on adjacent property and could utilize portions of the ACDC and the common right-of-way. The aesthetic value of flowing water at the bottom of a stepped and landscaped channel with various levels used for trails, recreation and service is an improvement over the present plan. However, the benefits, in view of limited recreational opportunities, the high cost of development, maintenance and security, all subject to major flood damage, are questionable.

Construction of Alternate B would require approximately \$45 to \$55 Million in additional local funds. These funds would be required to relocate the Canal and construct other necessary utility relocations. It would delay the construction schedule two to four years for economic and design purposes and might jeopardize the existing federal funding priority.

Alternate C

Alternate C would cover the ACDC as presently planned and permit the Canal to be modified to incorporate water features on a phased basis. It would provide the best access and visibility for the water features and make available the most right-of-way for other uses. Phasing the development of the water features would permit maximum flexibility by completing selected sections of the Canal which best complement land use plans and make best use of available public and private funds.

Ready access to the Canal and perhaps adjacent small lakes or waterways would provide the most aesthetic and recreational value to the users, the adjacent neighborhoods, and the villages through which it flows. The additional right-of-way would permit development of picnic facilities, court games, an attractive and functional trail system, and would provide open space areas of great potential.

The estimated additional local funds required for Alternate C is \$30 to \$40 Million between 19th Avenue and 24th Street. A summary of estimated costs for Alternates B and C is shown in Appendix B.

Alternate C1

Recognizing the inherent value of covering the ACDC to provide the desired amenities, the committee developed two additional modifications to Alternate C. The first, Modification C1, would reinforce the ACDC walls now to accept a cover at a later date. The option to cover the ACDC would thus be preserved for Reaches 3 and 4 west of 24th Street. It would also permit implementation in selected areas when expenditures are justified and development funds are available.

The initial local cost for Alternate C1 is relatively low. It would provide an opportunity to transfer the cost of design and construction of the future cover to the private sector. Inherent in this Alternate is the additional delay and associated costs to provide a design that will adequately handle side drainage and to obtain approval of that design from the Corps and the Flood Control District. Thus, it has disadvantages from a potential developers point of view.

It is estimated that Alternate C1 would require approximately \$4 to \$10 Million in additional local expenditures to reinforce the ACDC between 19th Avenue and 24th Street. It would also result in an approximate two-year delay for evaluation and redesign by the Corps. An additional \$40 to \$50 Million would be required later to construct the entire cover.

Alternate C2

Alternate C2 would consist of constructing the ACDC as presently planned. A structurally independent cover, supported on caissons, could then be built at a later date over all or selected portions of the ACDC.

This Alternate would not require any initial local funds nor would it delay the present construction schedule. All future construction costs could potentially be transferred to the private sector. These costs are estimated to be between \$65 and \$75 Million for the Reach between 19th Avenue and 24th Street. In addition to the higher total cost, this Alternate would still have the same disadvantages from a developers point of view as C1.

If construction of only selected portions of either alternate C1 or C2 would limit potential recreation advantages, increase the potential for developer conflicts and create technical issues that will be difficult to solve.

Appendix C shows the estimated cost comparison for Alternates C, C1, and C2, the estimated time delays associated with each, and possible funding sources. The second page lists pros and cons for the same alternates.

CONCLUSIONS

The combined right-of-way has the potential to increase public acceptance of the project by providing water oriented recreational/commercial development opportunities not possible with the present plan. It could provide a unifying community feature that would encourage public access and use of facilities such as exercise courses, trails, pathways, islands and landscaped areas for relaxation. At the major arterial street intersections increased activity, structures, commercial development and ancillary services could be developed that would take advantage of the water features attractive to the public. The project would also have the potential to enhance redevelopment of existing residential neighborhoods and commercial areas. It could stimulate the local economy by creating an opportunity for additional cultural activities, increasing the tax base, permitting more recreational and entertainment events, and becoming a tourist attraction.

Construction projects are normally less expensive, more efficient, and perform better if they are designed and constructed as a single concept. However, it is concluded that either Alternate C, C1, or C2 has the potential to fulfill the concept of maximizing the joint use of the ACDC and the Arizona Canal rights-of-way.

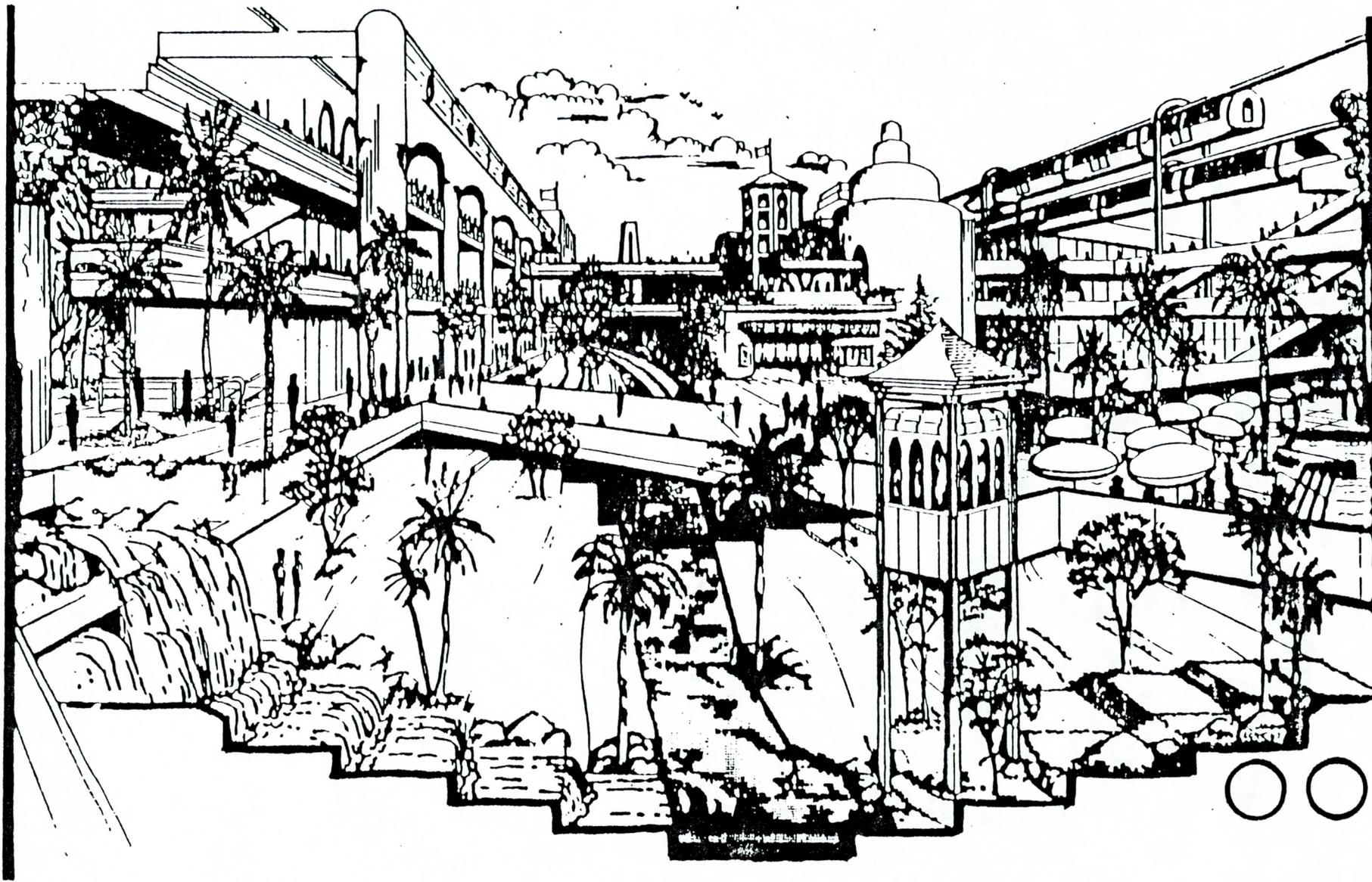
Regardless of the alternate ultimately selected, five action items have been identified as necessary for further progress. They are:

- * Complete a detailed evaluation of the location and extent of the development potential between 21st Avenue and 24th Street.
- * Obtain a commitment for, or develop a plan to obtain, the necessary additional local funding.
- * Decide whether or not to pursue an alternate to the present ACDC design.
- * Notify the Corps of Engineers of the desired alternate.
- * The time delays for reanalysis reported by the Corps staff appear excessive. The Committee suggests that the issue be discussed with higher authority in the Corps. Possible contacts would be the Los Angeles District Engineer, the South Pacific Division Engineer or the Director of Civil Works.



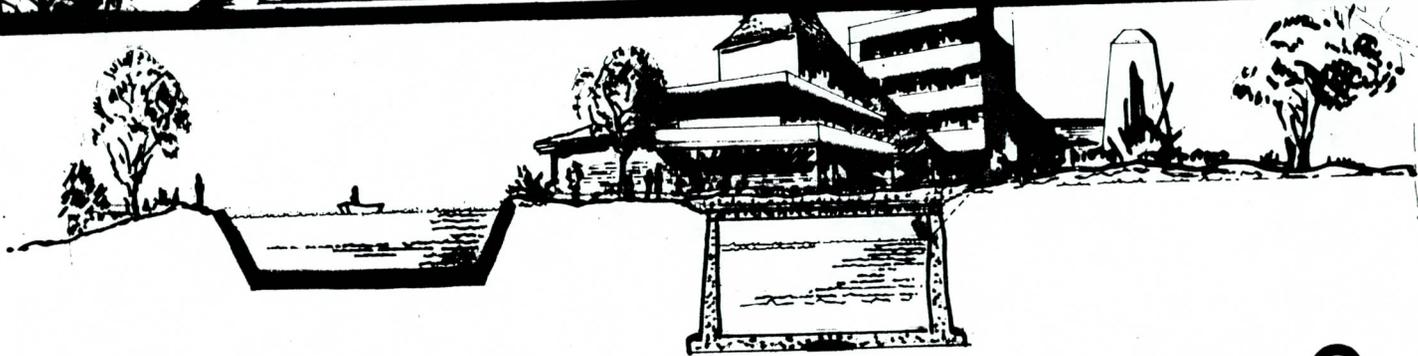
ALTERNATE **A**

PLATE 1



ALTERNATE **B**

PLATE 2



ALTERNATE C

PLATE 3

SUMMARY OF ISSUES

		Immediate Resolution Required?
		Y/N
1)	Impact on ACDC	Y
	a. Delay to current schedule	Y
	b. Loss of current priority	Y
	c. Potential for Reformulation (B/C Ratio)	Y
2)	Local Funding	Y
3)	Economic Benefits	Y
4)	Community Benefits	N
	a. Compatibility with City of Phoenix Plans	N
	b. Park and Recreational Benefits	N
	c. Public Acceptance	N
	d. Elimination of the barrier between cities	N
5)	Plan Specific Issues	N
	a. Safety	N
	b. Operating Agency & Maintenance - ACDC	N
	c. Operation and Maintenance - Canal ..	N
	d. Multiple-use Water Concerns	N
	(Quality, Conservation, Water Rights)	N
	e. Rights-of-Way - Joint Use/Legal rights	N
	f. Rights-of-Way - Utility Corridor ...	N
	g. Constructability & Interim Flood Protection	N

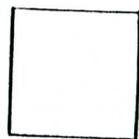
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SUMMARY OF ESTIMATED COSTS (MILLIONS \$)

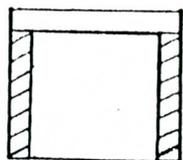
<u>FEATURE</u>	<u>CURRENT CORPS APPROVED DESIGN</u>	<u>ALTERNATE B (OPEN ACDC/ PIPED CANAL)</u>	<u>ALTERNATE C (COVERED ACDC/ OPEN CANAL)</u>
CHANNEL	50.3	60.9	85.2
LAND & DAMAGES	28.4	28.4	28.4
RELOCATIONS	18.7	57.0	18.7
TOTAL FLOOD CONTROL	97.4	146.3	132.3
<u>FUNDING</u>			
FEDERAL	50.3	50.3	50.3
LOCAL	47.1	96.0	82.0
DIFF. COSTS	0	48.9	34.9

COMPARISON OF ALTERNATE C VARIATIONS

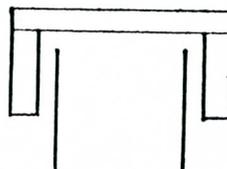
<u>ALTERNATE</u>	<u>ESTIMATED MINIMUM TIME DELAY (Months)</u>		<u>ROUGH COST ESTIMATE (Millions \$)</u>			<u>PROBABLE FUNDING SOURCES</u>	
	<u>NOW</u>	<u>FUTURE</u>	<u>NOW</u>	<u>FUTURE</u>	<u>TOTAL</u>	<u>LOCAL GOVT.</u>	<u>PRIVATE</u>
C	12-18	--	35	--	35	X	
C ₁ (Walls)	12-18	6-12 (each submittal)	5	45	50	X	X
C ₂ (Abutments)	--	6-12 (each submittal)	--	70	70	X	X



C



C₁



C₂

Alternate

Pros

Cons

C

- o All design and approvals up front
- o Immediately ready for development
- o Provides best inducement to development
- o Lowest total cost
- o Immediate community benefits

- o Highest initial cost
- o Delay of 1-2 years

C₁

- o Lower initial cost than C
- o Potential private sector funding
- o Allows development of only best areas

- o Delay of 1-2 years
- o Higher total costs than C
- o Requires extensive approval and engineering design for each segment

C₂

- o No initial cost
- o No initial delay
- o Potential private sector funding
- o Allows development of only best areas

- o Requires extensive approval and engineering design for each segment
- o Higher total cost