

FINAL ENVIRONMENTAL ASSESSMENT
AK-CHIN OPTION AND LEASE AGREEMENT

Prepared by

Jones & Stokes Associates, Inc.

for

U.S. Bureau of Reclamation
Phoenix Area Office
Lower Colorado Region
Phoenix, AZ



November 1997



United States Department of the Interior

BUREAU OF RECLAMATION

Phoenix Area Office

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To: All Interested Persons, Organizations, and Agencies

From: Thomas G. Burbey
Area Manager

Subject: Finding of No Significant Impact (FONSI) and Final Environmental Assessment (EA) for the Provision of Leased Ak-Chin Indian Community Water to Del Webb Corporation (Del Webb) for Use at The Villages at Desert Hills (The Villages), Maricopa County, Arizona

Reclamation has determined that provision of leased Ak-Chin Indian Community water to Del Webb for use at The Villages will not significantly impact the environment. A copy of Reclamation's FONSI is attached. Del Webb intends to pipe the leased water from Waddell Canal (just south of Lake Pleasant) and treat it for use as a drinking water supply for The Villages. The Villages is located approximately 3 miles north of Carefree Highway and 7 miles east of Lake Pleasant, in Maricopa County, Arizona.

On June 9, 1997, copies of the draft EA were distributed to over 300 Federal, State and local agencies, organizations, and interested individuals. A public hearing was held on June 28, 1997, in New River, Arizona, to provide the public with an opportunity to provide oral comments on the adequacy of the draft EA. Public notification of the draft EA's availability and public hearing was published in four local newspapers twice before June 9, 1997. Twenty-five people provided comments for the public record at the June 28, 1997, hearing. A total of 36 written comment letters were received during the public comment period, which ended on September 8, 1997. Comment letters expressing opposition to either the provision of leased water to Del Webb or the development of The Villages felt an environmental impact statement (EIS) should be prepared.

Reclamation's decision to focus the scope of the EA on the construction and operation of the water delivery and treatment system was based upon its determination that it was reasonable to conclude The Villages would be constructed using an alternative water supply in the absence of the leased water. None of the comments received on the adequacy of the draft EA provided substantiation that information regarding the availability of alternative water supplies was factually incorrect. Additionally, none of the comments received, nor Reclamation's own independent review of the information, caused Reclamation to believe a more intensive investigation regarding alternative water supply sources was needed.

A final EA has been prepared that incorporates changes made in response to all comments received, where appropriate. The final EA also includes a summary of all oral comments made, and copies of all written comments received, as well as Reclamation's responses.

On behalf of Reclamation, I thank everyone that participated in the public scoping and document review process. Your interest in this project is appreciated. Should you have any questions regarding this matter, please contact Ms. Sandy Eto of my staff at the above address, Attention: PXAO-1500, 602-395-5688.

Thomas G. Burbey

Attachments 2

United States Department of the Interior
Bureau of Reclamation
Lower Colorado Region
Phoenix Area Office

FINDING OF NO SIGNIFICANT IMPACT

Provision of Water to Del Webb Corporation
under the Ak-Chin Option and Lease Agreement

Maricopa County, Arizona

Approved: Thomas G. Burbey
Thomas G. Burbey
Area Manager, Phoenix Area Office
Bureau of Reclamation

Date: 11/18/97
FONSI No. PXA0-97-4

Pursuant to the National Environmental Policy Act of 1969 (NEPA), as amended, and based upon the following, the Bureau of Reclamation (Reclamation) has determined that provision of leased Ak-Chin Indian Community (Ak-Chin) water under an Option and Lease Agreement among Ak-Chin, Del Webb Corporation (Del Webb) and the United States of America, to Del Webb for use at The Villages at Desert Hills (The Villages) will not result in a significant impact on the human environment.

BACKGROUND

In 1994, the Ak-Chin, Del Webb, and the United States executed an Option and Lease Agreement (Agreement) for provision of between 6,000 and 10,000 acre-feet of water per year from Ak-Chin to Del Webb. Because Del Webb's plans for taking and using the water were not completed at the time the Agreement was executed, Reclamation included a clause in the Agreement that stated notwithstanding any other provision of the Agreement, no leased water would be delivered to Del Webb unless and until Del Webb has obtained final environmental clearance from the United States.

Based upon information provided by Del Webb regarding its plans for taking and using the leased water, which indicated water would be used at its The Villages development, Reclamation determined an environmental assessment needed to be prepared pursuant to the NEPA. Reclamation determined it was reasonable to conclude that development of The Villages would occur even in the absence of provision of the leased water and, accordingly, the environmental impacts of The Villages were not a consequence of the provision of leased settlement water. However, Reclamation wanted to provide the public with an opportunity to review and comment upon this preliminary determination as part of the public involvement process. The information provided in the draft environmental assessment (EA) and public review comments would be used to assist Reclamation decision-makers in determining whether a Finding of No Significant Impact (FONSI) is appropriate or an environmental impact statement (EIS) should be prepared.

Extensive public involvement was incorporated into the NEPA process, due to the strong public interest expressed in The Villages development. On October 17, 1996, notices were mailed to 265 interested agencies, organizations, and persons regarding a public scoping meeting to be held, and a 30-day public scoping comment period, on preparation of an EA for this project. Reclamation conducted an agency coordination meeting on October 31, 1996, in which five agencies and several members of the general public attended. The public scoping meeting, held in New River, Arizona, on November 2, 1996, was attended by over 60 people of which 15 provided oral comments. Because of numerous complaints regarding insufficient advance notice of the meeting, Reclamation extended the public scoping comment period an additional 30 days. A notice regarding this extension was sent to over 300 recipients on November 12, 1996. A total of 68 comment letters were received regarding the scope and content of the draft EA; approximately half supported and half opposed the proposed

development. Many commentors opposing the development believed an EIS was required, or felt one should be prepared. Other commentors indicated long-term impacts from The Villages development needed to be addressed in the EA.

Copies of the draft EA were distributed on June 9, 1997, to over 300 Federal, State and local agencies, organizations, and interested individuals. A public hearing was held on June 28, 1997, in New River, Arizona. Approximately 150 to 200 people attended the public hearing. Twenty-five people provided oral comments for the public record. The comment period ended September 8, 1997. A total of 36 written comments were received from 35 commentors. A summary of the oral comments, and copies of all written comments are included in the final EA, along with Reclamation's responses to all comments.

FINDING OF NO SIGNIFICANT IMPACT

Reclamation has determined that provision of Ak-Chin leased settlement water to Del Webb for use at The Villages in north Maricopa County, Arizona, will not significantly impact the environment, and that preparation of an EIS is not required. This decision is based upon the following considerations.

1. The water delivery and treatment system to be constructed by Del Webb consists of a turnout structure and pumping plant at the Waddell Canal, a 9-mile transmission pipeline, storage reservoirs, and a water treatment plant. Approximately 58 percent of the pipeline alignment is located within or adjacent to previously disturbed corridors. The turnout/pumping plant facilities would be located on 0.5 acre. The total area that would be disturbed during construction of the pipeline would be approximately 148 acres, of which approximately 33 acres would be needed for permanent facilities. The storage reservoirs and water treatment facilities would be located within a 44-acre site on Del Webb property located east of I-17.

2. Reclamation has concluded the impacts resulting from the implementation of the delivery system described in No. 1 above will not significantly affect the environment. The temporary and permanent loss of Sonoran desertscrub habitat that will occur from construction and operation of the pumping plant, pipeline and water treatment facilities will not result in a significant adverse impact. The habitat to be impacted is of moderate quality due to previous heavy grazing use. Sonoran desertscrub habitat is relatively abundant throughout the region. No federally-protected species will be impacted by the construction and operation of the water delivery and treatment facilities. No cultural resources were found within any areas proposed to be disturbed during construction of the system facilities. Impacts to water and air quality will be minimal.

3. The environmental commitments identified in the EA (whether listed in Section 4 or elsewhere) will be implemented by Del Webb during its construction of the water delivery and treatment system.

4. A biological assessment was prepared that concluded there will be no effect to federally-listed species resulting from the construction and operation of the system facilities. It further concluded no cumulative impacts from the development of The Villages are anticipated. Fish and Wildlife Service did not contest this conclusion. Compliance with the Endangered Species Act has been completed.

5. Reclamation has concluded Section 106 consultation pursuant to requirements of the National Historic Preservation Act (NHPA). For purposes of fulfilling the requirements of Section 106, the "area of potential effect" considered included the proposed pipeline corridor, water treatment facilities and The Villages, which is consistent with 36 CFR Part 800 (Protection of Historic Properties). No historic properties were identified within areas to be disturbed resulting from construction and operation of the water delivery and treatment facilities. Thirteen archaeological sites were identified within the property boundary of The Villages. All were evaluated for their eligibility for listing on the National Register of Historic Places (NRHP). Reclamation, with State Historic Preservation Officer (SHPO) concurrence, has determined six of these sites are eligible for listing on the NRHP. A Memorandum of Agreement (MOA) among Reclamation, the Advisory Council on Historic Preservation and SHPO requires the development and implementation of a historic property avoidance and treatment plan to comply with Section 106 for the affected historic properties. Reclamation will ensure the MOA is executed.

6. Reclamation has determined that under the "no Federal action" scenario, it is reasonable to conclude The Villages would be constructed in any event. Reclamation independently reviewed information provided by Del Webb regarding four water supply options that would neither require Federal approval or involve Federal monies or action. Reclamation also independently contacted city of Phoenix staff to confirm the accuracy of information provided by Del Webb. In response to Reclamation's request for comments on the adequacy of the draft EA, none of the comments received indicated the information provided by Del Webb or the assumptions made regarding availability of resources were factually incorrect. Nor did any of the comments cause Reclamation to conclude a more intensive investigation regarding the viability of these options was warranted. Arizona Department of Water Resources (ADWR) reviewed the water supply option information provided by Del Webb for conformity to regulations pertaining to water provider service areas and assured water supply. ADWR expressed its belief that one of the options did not appear to meet the legal requirements for establishing a service area and for demonstrating an assured water supply. Reclamation has not relied upon that particular option as the basis for concluding viable alternative water supplies exist in the absence of the leased settlement water.

This determination of the availability of viable water supply options was the basis for determining the scope of the EA and the environmental impacts associated with the proposed action.

7. Additional NEPA will be conducted as appropriate if other points of delivery are identified by Del Webb.

Documents related to this action are identified below.

U.S. Bureau of Reclamation. 1997. Biological assessment for the Ak-Chin Option and Lease Agreement water delivery facilities. Prepared by Jones & Stokes Associates for U.S. Bureau of Reclamation Phoenix Area Office, Phoenix, AZ.

_____. 1997. Final environmental assessment on the Ak-Chin option and lease agreement. Prepared by Jones & Stokes Associates for U.S. Bureau of Reclamation Phoenix Area Office, Phoenix, AZ.

Memorandum of Agreement among Advisory Council on Historic Preservation, Bureau of Reclamation and Arizona State Historic Preservation Officer regarding provision of Ak-Chin leased settlement water to Del Webb under the Ak-Chin Option and Lease Agreement. 1997. Phoenix, AZ.

**Final Environmental Assessment for the
Ak-Chin Option and Lease Agreement**

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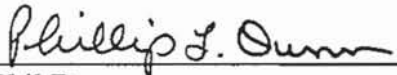
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November 1997

DISCLAIMER

Pursuant to the requirements of 40 CFR Section 1506.5, Jones & Stokes Associates declares under oath that it has no interest, financial or otherwise, in the outcome of this project.



Phil Dunn
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11-11-97

Date

This document should be cited as:

Jones & Stokes Associates, Inc. 1997. Environmental assessment for the Ak-Chin option and lease agreement. Final. November. (JSA 96-236.) Phoenix, AZ. Prepared for U.S. Bureau of Reclamation, Phoenix, AZ.

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Section 1.0 Purpose and Need

1.1 INTRODUCTION

The Ak-Chin Indian Community (Community), United States of America, and Del Webb Corporation (Del Webb) have entered into an Option and Lease Agreement that would allow the Ak-Chin Indian Community to lease between 6,000 and 10,000 acre-feet per year (af/yr) of water to Del Webb for 100 years. Delivery of water under the Option and Lease Agreement requires completion of appropriate environmental review under the National Environmental Policy Act (NEPA).

Del Webb plans to transport the leased water by constructing a 9-mile-long pipeline from Waddell Canal south of Lake Pleasant to a future master planned community—The Villages at Desert Hills (The Villages)—that would be located approximately 3 miles north of the Carefree Highway (State Route [SR] 74) and 7 miles east of Lake Pleasant in Maricopa County, Arizona. The pipeline system would include a turnout structure at Waddell Canal, a small pumping plant, pretreatment facilities, the transmission pipeline, storage reservoirs, and a water treatment plant.

1.2 PURPOSE OF AND NEED FOR ENVIRONMENTAL ASSESSMENT

Background

In 1984, Congress enacted Public Law 98-530, the Ak-Chin Settlement Act (Settlement Act), which directed the Secretary of the Interior to deliver 75,000 acre-feet (af) of surface water annually to the Ak-Chin reservation at no cost to the Ak-Chin Indian Community. Colorado River water delivered through the Central Arizona Project (CAP) was specified as the source of the water. To implement the Settlement Act, the United States and the Community signed a contract in 1985 to provide permanent water and settle interim water rights. In 1992, Congress amended the Settlement Act to permit the Community to lease or exchange settlement water for beneficial use within the Pinal, Phoenix, and Tucson Active Management Areas, for periods not to exceed 100 years. In 1994, the Ak-Chin Indian Community, United States of America, and Del Webb agreed to an Option and Lease Agreement for provision of between 6,000 and 10,000 af/yr of leased settlement water. Del Webb had not yet finalized its plans for taking and using the leased settlement water; however, to provide for federal environmental review and clearances before water delivery and to proceed with federal approval of the Option and Lease Agreement, the following clause was added

to the agreement to ensure that adequate environmental review requirements under NEPA would be met:

NEPA Compliance. Notwithstanding any other provision of this Agreement, Leased Settlement Water shall not be delivered to the Company unless and until the Company has obtained final environmental clearance from the United States. Final environmental clearance will be based upon an analysis of the environmental impacts of the Company's plans for taking and using Leased Settlement Water, in accordance with the National Environmental Policy Act of 1969 (83 Stat. 852) and other applicable environmental legislation. Any action(s) required on behalf of the Company in order to obtain final environmental clearance from the United States will be identified to the Company by the United States, and no Leased Settlement Water shall be delivered to the Company unless and until the Company has completed all such action(s) to the satisfaction of the United States. The cost of all such action(s), including the cost of review and oversight by the United States, shall be borne by the Company at no cost to the United States. The above requirements shall also apply to any new points of diversion of the Leased Settlement water proposed by the Company.

In December 1996, Del Webb chose to exercise its option to lease 10,000 af/yr. Del Webb also developed plans for taking and using the settlement water. The U.S. Bureau of Reclamation (Reclamation) has determined that an environmental assessment (EA) according to NEPA should be prepared to determine whether a finding of no significant impact is appropriate or if an environmental impact statement (EIS) should be prepared.

Purpose of this Environmental Assessment

This EA has been prepared to assess and disclose the environmental consequences of Reclamation's provision of leased settlement water under the Option and Lease Agreement. The EA addresses direct, indirect, and cumulative effects of the federal action. Because NEPA applies only to federal actions, the first step in determining the scope of the EA is to identify factors of the existing environment that might influence or be affected by the federal action. For Reclamation, this meant determining whether or not development of The Villages would be a consequence of the federal approval to provide leased water to Del Webb. Del Webb has identified alternative water supply options that could be used in the absence of receiving the leased Ak-Chin settlement water (Appendix A). Based on a review of these options, Reclamation believes it is reasonable to conclude that development of The Villages would occur in the absence of the proposed federal action. Please refer to the discussion of the No-Action Alternative in Section 2, "Proposed Action and Alternatives".

The No-Action Alternative, which describes the conditions that are assumed to exist in the absence of the federal action, provides the basis for comparing the environmental effects of the proposed action. Because The Villages could be developed in the absence of the federal action,

Reclamation is focusing its evaluation of the proposed action in this EA on the impacts associated with construction of the water delivery and treatment facilities needed to take and use leased settlement water. Factors of the existing environment that are addressed in determining the impacts of construction of the water delivery and treatment facilities include:

- biological resource effects, including loss of desert habitat and impacts on plant and wildlife species, including special-status species;
- historic and Indian trust assets effects, and prehistoric cultural resource effects;
- water resources effects;
- air quality and noise effects;
- traffic and circulation effects; and
- land use, visual resource, and environmental justice effects.

The EA was prepared in compliance with NEPA, Council on Environmental Quality Regulations (40 CFR, Parts 1500-1508), Reclamation's NEPA Handbook (U.S. Bureau of Reclamation 1990), Floodplains and Wetlands Executive Orders 11988 and 11990, the federal Endangered Species Act (ESA) (PL 93-205, as amended), the National Historic Preservation Act (NHPA) (16 USC 470), the Clean Air Act (42 USC 7401-7642), and the Clean Water Act (33 USC 1251 et. seq.).

1.3 PURPOSE OF AND NEED FOR THE WATER LEASE

The purpose of the proposed water lease is to provide a surface water supply leased from the Ak-Chin Indian Community to Del Webb. Del Webb intends to use the leased water at a master planned community known as The Villages located approximately 3 miles north of Carefree Highway and 7 miles east of Lake Pleasant in Maricopa County, Arizona. Del Webb will deliver water to The Villages by constructing a 9-mile-long water delivery pipeline from Waddell Canal to the site.

The Ak-Chin Option and Lease Agreement is one option available to Del Webb for providing a reliable water supply for The Villages master planned community. An alternative to groundwater is needed to prove the existence of an assured water supply under regulations promulgated by the Arizona Department of Water Resources (ADWR), to avoid adverse effects on groundwater resources in the development area and to meet Maricopa County Development Master Plan (DMP) Stipulation "r" for The Villages development. Stipulation "r" allows groundwater in the development area to be used by Del Webb only on an interim basis during early construction and for County and public uses until a permanent water supply system is completed and hookup is available. Stipulation "r" was added to the conditions of the DMP by the Maricopa County Board of Supervisors because of the concern of New River and Desert Hills residents about limited groundwater supplies in the development area. The Arizona Groundwater Management Code, which is administered by the

ADWR, also sets limits on who can use groundwater, how much can be withdrawn, and where it can be used. ADWR regulations governing the demonstration of assured water supplies are intended to preclude the use of groundwater in new developments such as The Villages, unless the groundwater is replenished with surface water. The regulations are a part of ADWR's strategy for meeting the primary goal of groundwater management in the Phoenix Active Management Area (AMA) to achieve safe yield of groundwater resources by 2025. Safe yield will occur when the rate of annual groundwater withdrawn in the AMA is less than or equal to the rate of aquifer recharge.

Section 2.0 Proposed Action and Alternatives

2.1 OVERVIEW

Public Law 98-530, the Ak-Chin Indian Community Water Rights Settlement Act, as amended, provides for a Colorado River water supply for the Ak-Chin Indian Community to be delivered through the CAP. The amended act also provides that the Ak-Chin Indian Community may lease a portion of the supply available to it for uses in Pima, Pinal, or Maricopa Counties.

The Ak-Chin Community, United States of America, and Del Webb have agreed to implement an Option and Lease Agreement that would allow the Ak-Chin Community to lease 10,000 af/yr of settlement water to Del Webb for 100 years. Under the proposed action, leased settlement water would be conveyed through the CAP and would be delivered from Waddell Canal. Del Webb plans to construct and operate a 9-mile-long pipeline with ancillary facilities from Waddell Canal to a proposed water treatment plant east of Interstate 17 (I-17) in Maricopa County.

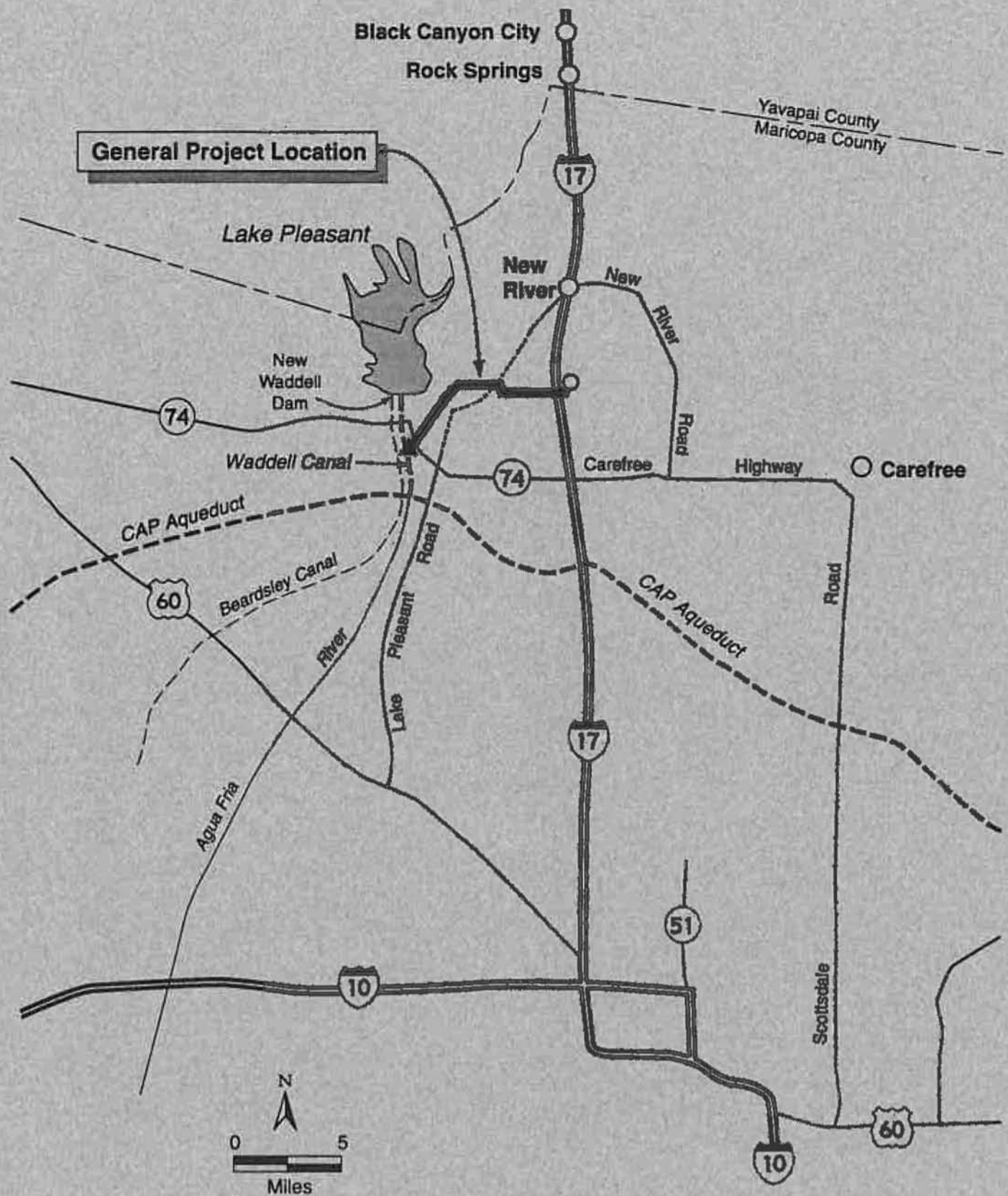
Under authority of the Colorado River Basin Act (PL 90-537), Reclamation is responsible for delivering water through the CAP. The federal action considered in this EA is Reclamation's provision of water under the Option and Lease Agreement.

2.2 PROPOSED ACTION

Reclamation proposes to provide leased settlement water under the Option and Lease Agreement to Del Webb for municipal and industrial use. Del Webb would construct water transmission facilities that would extend from Waddell Canal to a new water treatment plant (Figure 2-1). Pipeline facilities would consist of a buried pipeline with a turnout structure, pumping plant, and storage reservoirs at the terminus of the pipeline. The transmission pipeline and appurtenant facilities would be designed to deliver 10,000 af/yr of surface water supply.

The water delivery system would eventually be connected to a distribution system that would serve The Villages. Because alternative water supply options are available to Del Webb that do not involve a federal action, the EA assumes that development of the future master planned community would occur whether or not Reclamation provides water under the Option and Lease Agreement.

Deliveries of water from the CAP would be made pursuant to a schedule submitted annually by Del Webb to the United States and the Ak-Chin Indian Community and updated periodically to reflect the actual water demand of The Villages community. Del Webb would obtain a permit for a turnout facility from the Central Arizona Water Conservation District (CAWCD), and construct the



facility. An approved measurement device would be installed at the turnout. Measured flows would be continuously transmitted to the CAWCD operations center.

Del Webb may eventually pursue other uses of excess leased water (such as recharge or re-marketing). These other potential uses of excess leased water at other locations are speculative at this time; thus, no evaluation of environmental effects associated with other potential uses of the leased water has been included in this EA. Additional NEPA compliance would be conducted as appropriate should any additional points of delivery be proposed.

Water Supply Reliability

The water supply to be delivered from the CAP under the proposed action is highly reliable, both from the standpoint of legal and physical availability. The lease agreement among the Ak-Chin Indian Community, the United States of America, and Del Webb, is a legally binding document that assures that 10,000 af of Colorado River water available to the Ak-Chin Indian Community may be delivered to The Villages. The rate of delivery, if the full 10,000 af were used, may be as much as 40 cubic feet per second (cfs), which is far in excess of the maximum demand under the proposed action.

Colorado River water supplies made available to users in Arizona are delivered pursuant to contracts and laws with established priorities. Users with low priorities must reduce or stop using water if there is a shortage in Colorado River supply. Public Law 98-350 in conjunction with other federal laws and contracts, has established the priority of the Colorado River supply that must be delivered to the Ak-Chin Indian Community through the CAP facilities. The first 50,000 af of that supply is of a higher priority than any CAP water, including that to be delivered to cities and other Indian communities and tribes. This Colorado River water can be expected to be available even in times when no other water is available through the CAP. The next 25,000 af of the total 75,000 af that must be delivered to the Ak-Chin Community under normal water supply conditions is first priority CAP water. The Water Settlement states that during shortage years on the Colorado River, Ak-Chin will receive a minimum of 72,000 af. The 10,000 af of water available to The Villages will be from this 72,000 af. The net effect of the priority of the supply and the binding agreement that Del Webb has with the Ak-Chin Indian Community and the United States of America, is that there are no foreseeable circumstances when there will not be a full water supply available to the planned community.

In addition to the dependability of a Colorado River supply, the CAP is a reliable delivery system. The canals and pumping plants are designed to allow for deliveries throughout the year without interruption for maintenance and repairs. However, unusual and unforeseen events may cause interruption of deliveries for short periods of time. The risk of interruption of deliveries under the proposed action is less than for most other CAP users because the point of delivery would be from the Waddell Canal. This take-out location provides that stored Colorado River water would be available from Lake Pleasant in the event that the flow of water in the CAP aqueduct from the Colorado River is interrupted.

Although the supply is highly reliable, the importance of a continuous water supply to a development the size of The Villages cannot be discounted. Options for adequate backup supplies are being evaluated and would be incorporated into the water delivery system. Included are onsite opportunities for aboveground reservoirs and aquifer storage. Any water use from wells would be from recharged water and would not adversely affect neighboring groundwater wells. The water recharge and recovery activity would require approvals from the Arizona Department of Water Resources and Maricopa County.

The following section describes the components of the water delivery system.

2.3 WATER DELIVERY SYSTEM COMPONENTS

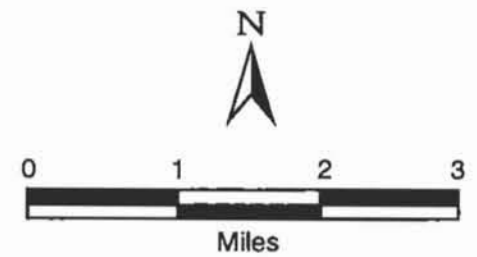
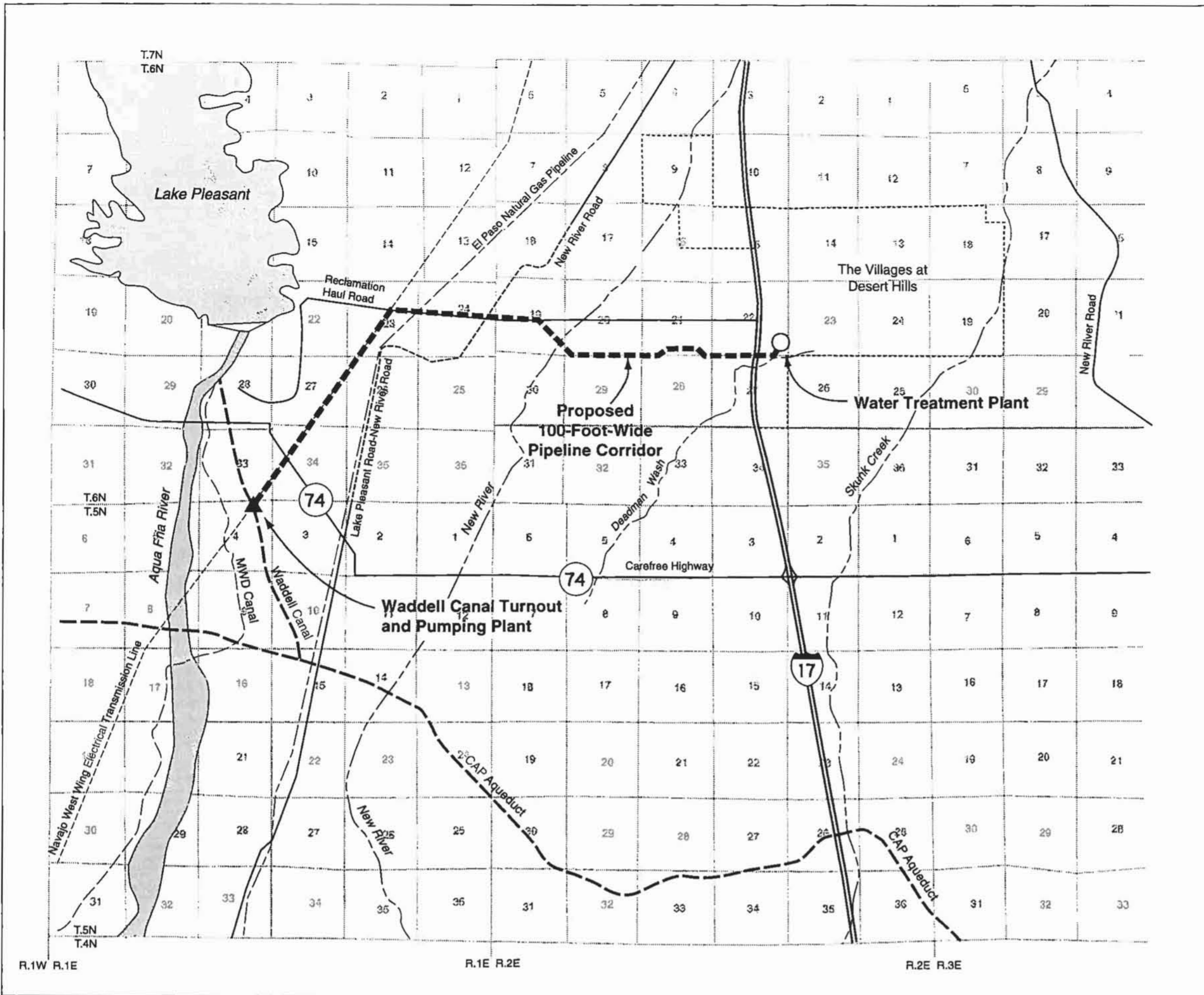
The water delivery system implementation would involve constructing and operating a turnout structure at Waddell Canal, a 9-mile-long transmission pipeline, storage reservoirs, and a water treatment plant. Total costs associated with constructing these system components would be approximately \$29 million.

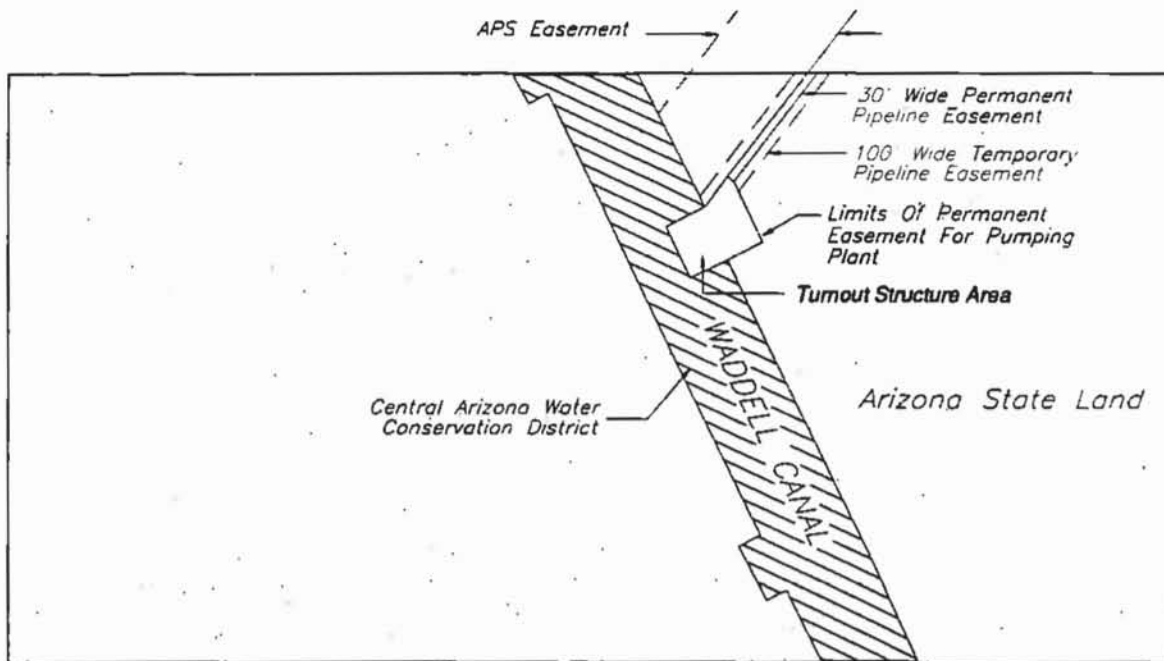
Turnout Structure and Pumping Plant

The turnout structure and pumping plant would be located on the eastern embankment of Waddell Canal at its intersection with the Arizona Public Service (APS) Navajo West Wing Project 500 kilovolt (kV) Southern Transmission Lines (electrical transmission lines) south of the SR 74 crossing (Figure 2-2) and would be used to deliver leased settlement water to the system. The turnout structure and pipeline would require a 100-foot-wide construction corridor and the pumping plant would require an approximately 150-square-foot area. To maintain existing flows within the canal during construction of the turnout, a temporary coffer dam would be constructed in the canal prior to the breaching of the canal and construction of the turnout structure. The proposed turnout structure would divert water by gravity to the pumping plant via an intake pipe. Figure 2-3 shows a detail of the proposed turnout structure location, and Figure 2-4 is an illustration of a typical turnout structure that could be used to divert water from Waddell Canal.

The pumping plant facilities would include a multiple bay concrete sump structure with pumping units on an operating platform. A standby diesel generation system and electrical instrumentation controls would also be included within a fenced security area. The sizes and capacities of the pumping units needed to pump water to the water treatment plant would depend on the rates of flows needed and the total dynamic head of the pumping conveyance system.

**Figure 2-2
Proposed Water Delivery Facilities
under the Ak-Chin Option
and Lease Agreement**





NORTH HALF OF SECTION 4 TOWNSHIP 5N RANGE 1E

BOOKMAN-EDMONSTON
ENGINEERING

OWNERSHIPS AND JURISDICTIONS
PUMPING PLANT AND TURNOUT

FIGURE 2-3

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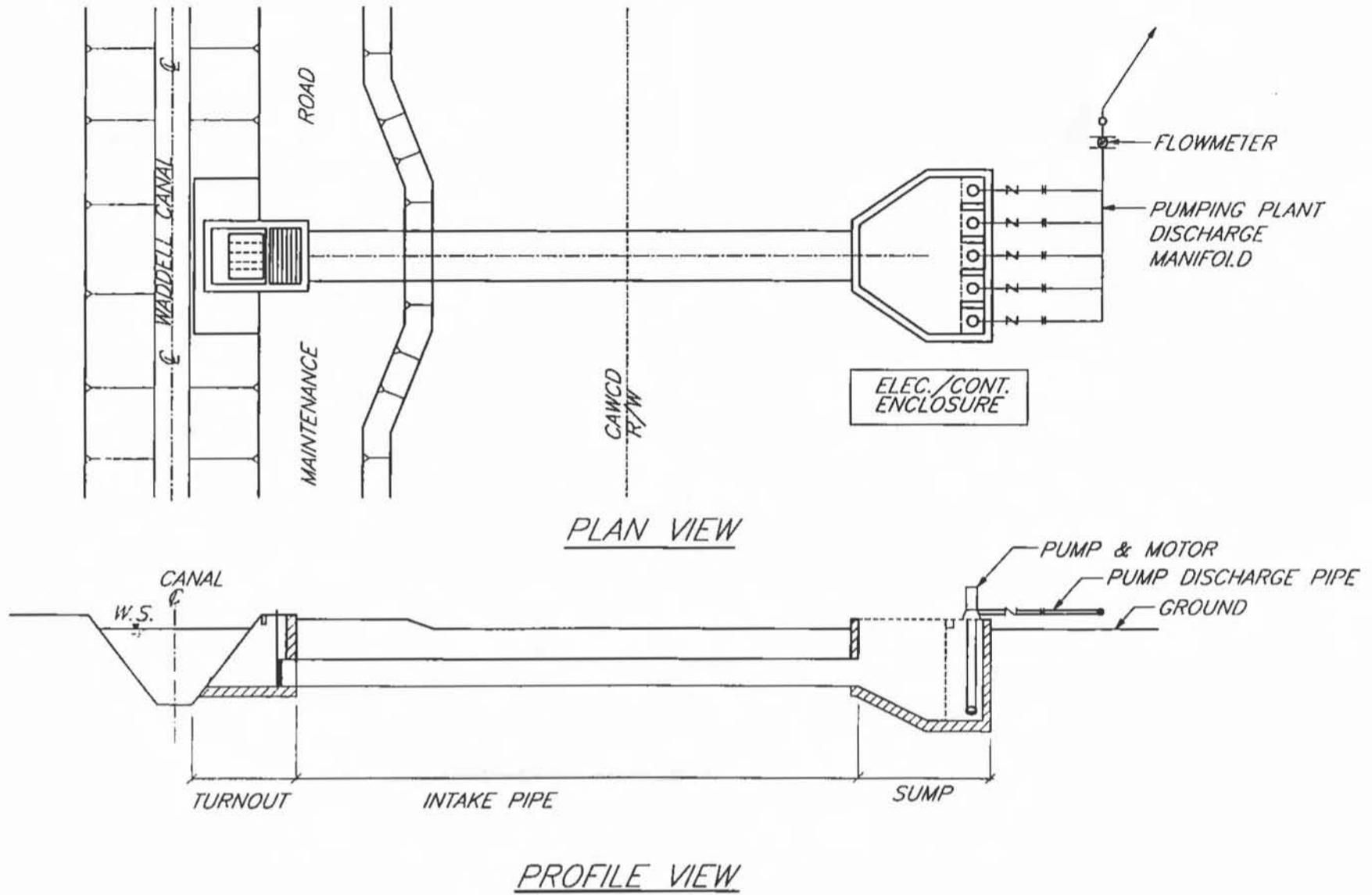


Figure 2-4
Typical Canal Turnout Structure

Transmission Pipeline

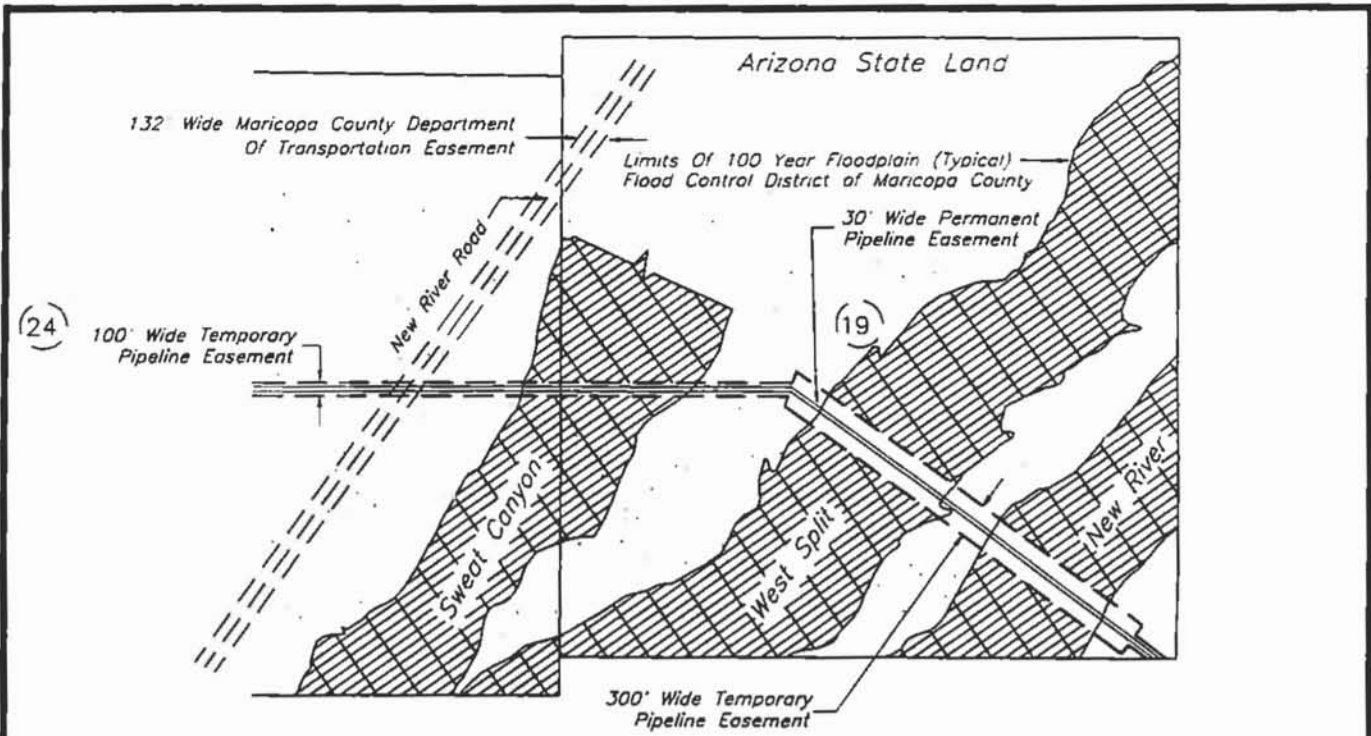
The 9-mile-long pipeline system would be located approximately 3 miles north of the Carefree Highway (SR 74), west of I-17, and southeast of Lake Pleasant (Figures 2-1 and 2-2). The 100-foot-wide pipeline corridor would begin at the turnout and pumping station on Waddell Canal at its intersection with the electrical transmission lines. The alignment would extend northeast from Waddell Canal on the east side of the transmission line corridor for approximately 3.3 miles to an intersection with a former haul road used by Reclamation to construct New Waddell Dam (Reclamation haul road) and then would extend east along the haul road alignment approximately 2.4 miles to a point approximately 0.5 mile west of New River. The alignment would then extend southeast across New River where the construction corridor would be approximately 200 feet wide. Additional corridor width is needed at New River to accommodate construction equipment in this area. East of New River, the alignment would be 100-feet wide and would extend approximately 3 miles to I-17 and beyond to its terminus at a proposed water treatment plant. The portion of the pipeline extending from the middle of Section 19 (Figure 2-2) east of New River was realigned following public scoping for the EA. Figure 2-5 provides a detail of the pipeline corridor at New River and Deadman Wash floodplains. (Please refer to "Alternatives Considered but Eliminated from Detailed Analysis", below, for an explanation of this change.)

The pipeline would be 30-36 inches in diameter and would consist of concrete cylinder or ductile iron pipes. Nominal pipeline pressure would be approximately 150 pounds per square inch.

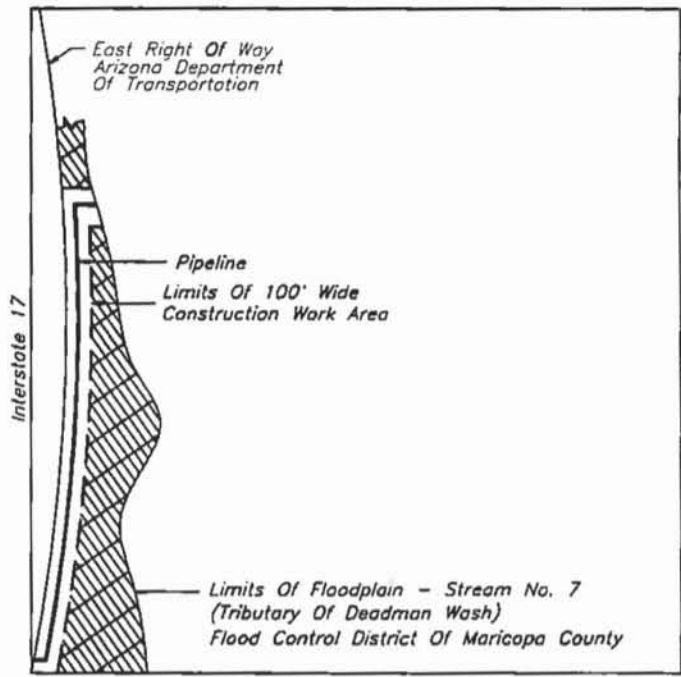
The pipeline would cross 6 roads (including SR 74 and New River Road), 17 minor washes, New River, an El Paso Natural Gas pipeline corridor, and I-17. The alignment topography ranges in elevation from 1,460 feet to 1,860 feet above mean sea level (msl) and stretches from near the Agua Fria River across the New River drainage to Deadman Wash. The pipeline would cross property owned or administered by Reclamation, Central Arizona Water Conservation District, Bureau of Land Management, State Land Department of Arizona, Arizona Department of Transportation, and Maricopa County Department of Transportation (Figure 2-2). Most of the 9-mile-long pipeline alignment crosses state land and would require right-of-way (ROW) easements. Figure 2-6 is a detail of the pipeline corridor near BLM land.

Raw Water Storage and Water Treatment Plant

The leased water delivered through the pipeline is planned to be stored and treated within the 44-acre site set aside in the southwest portion of The Villages property (Section 22) for the water and wastewater treatment facilities (Figure 2-2). The potable water treatment plant would include presedimentation, coagulation, flocculation, sedimentation, filtration, chlorination, water storage, and solids-handling facilities. Raw water would be stored in two 2-million gallon concrete-lined storage reservoirs. These reservoirs would occupy between 1 and 2 acres and would have an average depth of 10-12 feet. The reservoirs would be the discharge point of the pipeline and would be situated below grade at the head works of the water treatment plant to enable gravity feed into the plant of



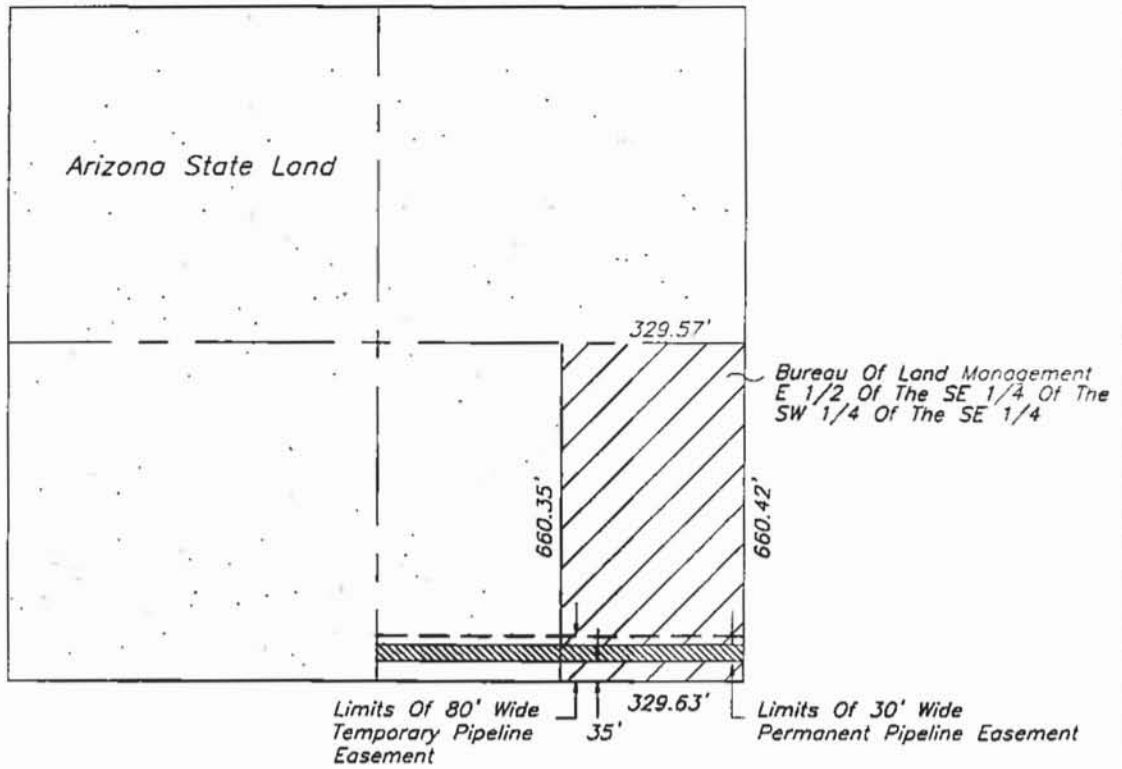
SECTION 19 TOWNSHIP 6N RANGE 2E
SECTION 24 TOWNSHIP 6N RANGE 1E



SOUTHEAST QUARTER OF SECTION 22 TOWNSHIP 6N RANGE 2E

<p>BOOKMAN-EDMONSTON ENGINEERING</p>	<p>OWNERSHIPS AND JURISDICTIONS - NEW RIVER AND DEADMAN WASH FLOOD PLAINS</p>	<p>FIGURE 2-5</p>
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SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER
SECTION 20 TOWNSHIP 6N RANGE 2E

BOOKMAN-EDMONSTON
ENGINEERING

OWNERSHIPS AND JURISDICTIONS
BUREAU OF LAND MANAGEMENT

FIGURE 2-6

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a continuous flow of water through underground piping. The storage capacity is needed to regulate and maintain flows on a 24-hour basis and to meet peak demands.

Construction and Operation

Construction of the pipeline would require space for trench excavation and backfill, pipe storage, and equipment operations. Pipe would be placed along the alignment before excavation and installation operations. A 100-foot-wide temporary construction easement is assumed for most of the pipeline alignment and appurtenant facilities. The crossing of New River and the pumping plant site would require larger construction sites (approximately 200 feet-wide). Before construction, all vegetation in the immediate vicinity of the pipeline alignment (20-30 feet) would be removed within the construction corridor and handled in accordance with state law; varying amounts of vegetation could be affected in other areas of the proposed corridor. Topsoil would be stripped from the trench area and stockpiled nearby for use during reclamation. Generally, material would be excavated to a depth of approximately 9 feet and placed adjacent to the trench.

After the trench is excavated, a crane would pick up the pipes and position them in the trench. The construction corridor would be an adequate width to accommodate trenching pipe storage, pipe laying operations, and bedding and backfill operations. Bedding material would be placed and compacted in the trench, followed by placement of common backfill materials. Bedding material would be obtained from a local commercial source or generated by screening material that is excavated during construction. Excess material would be spread over the disturbed area after pipeline construction and covered with stockpiled topsoil.

Pipeline construction would require crossing 17 minor drainages, and New River. These drainages do not have perennial streamflow; streamflow occurs only during brief periods of heavy thunderstorms. The pipeline would be buried at a depth sufficient to protect against scour from a 100-year flood. After construction, the drainages would be restored to near-original conditions. The pipeline would be sited under I-17 and Lake Pleasant Road.

After construction is complete, a permanent 30-foot-wide maintenance easement would provide access to the pipeline.

Approximately 58% of the pipeline length would be located within or adjacent to the previously disturbed corridors of the electric transmission lines and the abandoned Reclamation haul road. The turnout structure and pumping plant would be sited on a 0.5-acre site and the pipeline construction corridor would encompass approximately 103 acres. The total area that could be affected by construction activities within the over 9-mile-long pipeline corridor is approximately 148 acres. The permanent 30-foot-wide pipeline corridor would encompass approximately 33 acres assuming that the pipeline would be 9 miles long.

Construction of the raw water storage facilities would involve excavation to design depths, and the excavated material would be used to fill low areas on the plant site. If there is any surplus,

it is anticipated that it would be used on other areas of adjoining property requiring fill, rather than being hauled offsite beyond the adjoining property.

Construction and operation of the water treatment plant would involve clearing up to 44 acres for the plant site and administrative and laboratory facilities. Construction of the processing area and other buildings would involve standard construction practices including construction of an access road on the site to the treatment plant. The water treatment facilities would be automated to reduce operator dependence and ensure operation reliability. Backup power supply also would be provided to ensure operation reliability.

The delivery facilities would be owned and operated by a water company to be established to serve The Villages. The water company could be a subsidiary of Del Webb or another water supply entity. The pumping plant would be operated remotely.

2.4 NO-ACTION ALTERNATIVE

The No-Action Alternative represents the conditions that are assumed to exist in the absence of the proposed federal action and provides a basis for comparison with the proposed action. Under the No-Action Alternative, Reclamation would not provide water under the Option and Lease Agreement, and the specific water delivery and treatment facilities described in connection with the proposed action would not be constructed. Reclamation assumes that if the Option and Lease Agreement were terminated, sufficient water demand exists in central and southern Arizona that would allow the water supply to be leased to another entity by the Ak-Chin Indian Community.

Del Webb has identified alternative water supply options that could be used in the absence of leased settlement water and without the need for Reclamation approval. These water supply options are described in Appendix A. Based on this information, Reclamation believes it is reasonable to conclude that development of The Villages would occur in the absence of the proposed action. Similarly, Reclamation assumes that a water delivery system would be constructed to serve The Villages even if the proposed action is not pursued.

Because Reclamation has determined it is reasonable to conclude that development of The Villages would occur regardless of whether the proposed action occurs, The Villages are included in the discussion of the No-Action Alternative, which represents the conditions that are assumed to exist in the absence of the proposed federal action. The discussion of The Villages in Section 3 includes a description of the affected environment of the proposed Villages development site and a summary of environmental issues related to development of The Villages. To ensure that no confusion is created about what constitutes the "affected environment" of the pipeline corridor, existing conditions and environmental issues for The Villages are summarized together under the No-Action Alternative heading in the "Environmental Consequences and Mitigation Measures" sections of each topical resource area. The environmental consequences of The Villages also are summarized in Section 3.9 in the discussion of the cumulative impacts. The Villages will constitute part of the background of past, present, and reasonably foreseeable future actions against which the incremental effects of the proposed action will be assessed.

Because Reclamation has determined it is reasonable to conclude a water delivery system would be constructed to serve The Villages even if the proposed action is not pursued, the alternative water supply options identified by Del Webb are considered as part of the No-Action Alternative. For ease of analysis in examining the environmental effects of the No-Action Alternative, water supply Option 1 (provision of water service to The Villages by the City of Phoenix) has been selected to represent the various alternative water supply options, and is described in greater detail in order to identify the kinds of effects that may occur with any of the alternative water supply options.

Water Supply Option 1

Under water supply Option 1, as described in Appendix A, the City of Phoenix would provide water service to The Villages from the City's existing water supply system through a series of pipeline extension agreements. The City's distribution system and service area would be extended to include The Villages. The distribution system under this option would involve connecting The Villages water supply pipeline to a 66-inch transmission line adjacent to Deer Valley Road that delivers treated City system water to areas west of 35th Street. The connection point would be just east of I-17 at Deer Valley Road, and from there, the pipeline would extend north on the eastern side of I-17 for approximately 12 miles to The Villages development area. The pipeline would be parallel and adjacent to the I-17 300-foot right-of-way and would consist of a 24-inch diameter pipeline from Deer Valley Road to Carefree Highway and a 36-inch diameter pipeline from Carefree Highway to The Villages development. A temporary construction right-of-way of 100 feet (300 feet at the New River crossing only) would be needed; the permanent right-of-way would be 30 feet. A booster pumping plant located south of Happy Valley Road would be necessary to deliver the treated water. A water treatment plant on The Villages site would not be required under this option.

The Villages at Desert Hills

The Villages is a proposed 5,661-acre master planned community that would be located approximately 3 miles north of the Carefree Highway and 7 miles east of Lake Pleasant on I-17. The Villages is envisioned as a self-contained, multiple-use, mixed-density community of four interrelated "villages" with numerous amenities. The adopted master plan was approved to consist of 32 development areas on 4,969.5 acres planned for residential units; a maximum of 16,526 residential units would be phased in over the life of the project. Predominately single-family detached residential units would be developed at low to medium densities. The average density for the entire project, including high density units, is 2.9 dwelling units per acre. Although the adopted master plan is for a maximum of 16,526 residential units, Del Webb has recently indicated there would likely be 2,000 fewer units.

Development of The Villages in Maricopa County is subject to a DMP that includes a land use plan detailing the natural planning constraints and a Neighborhood Unit Plan of Development (NUPD), Planned Development overlays, and a special-use permit. The land use plan features a self-contained, mixed-use master planned community with interspersed open space areas and trails as well

as golf courses. The DMP also includes an Ecological Resources Management Plan, Community Services and Facilities Plan, Circulation Plan, Drainage Plan, and Public Utilities and Services Plan.

Among the notable features identified in the DMP are the following:

- devotion of 38% of the site (2,150 acres) to open space, including undisturbed natural areas, restored areas, parks and playfields, equestrian trails, and golf courses;
- preservation of hillsides with slopes greater than 15% and major drainages;
- visual resource considerations and buffers near adjacent land use interfaces;
- access to I-17 at two interchanges;
- non-groundwater supply for municipal and industrial use and municipal-level wastewater treatment;
- Sheriff's substation and fire district site; and
- elementary and high school sites and facilities.

The project has also been found to be in compliance with Maricopa County Board of Supervisors' stipulations for the development master plan. Del Webb has also indicated that groundwater recharge facilities would be incorporated into the development. No details of these facilities are currently available.

2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

Alternative Pipeline Alignments

Planning for the pipeline alignments under the proposed action involved a detailed feasibility study that evaluated five alternative CAP turnouts at Lake Pleasant, Waddell Canal, and the CAP aqueduct (Bookman-Edmonston Engineering 1996). Figure 2-7 shows all the turnout structures and pipeline alignment configurations that were considered for this analysis. Alternative A consists of a turnout structure at Lake Pleasant, and Alternative B consists of a turnout from the penstock at Lake Pleasant. Most of the pipeline alignments for both Alternatives A and B would be located within the abandoned Reclamation haul road in a similar manner as described for the proposed action. Alternative C consists of a turnout structure on Waddell Canal at the SR 74 crossing and a pipeline alignment extending north to the New River Road alignment and the abandoned Reclamation haul road. The proposed turnout structure would be located approximately 1 mile south of the Alternative C site on Waddell Canal at the APS transmission line crossing. Alternatives D and E consist of

turnout structures on the CAP Aqueduct on the western and eastern sides of the I-17 crossing with pipeline alignments extending north to the development area.

Criteria for comparing the merits of each alternative included:

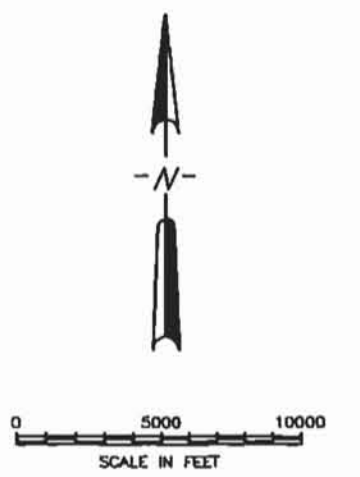
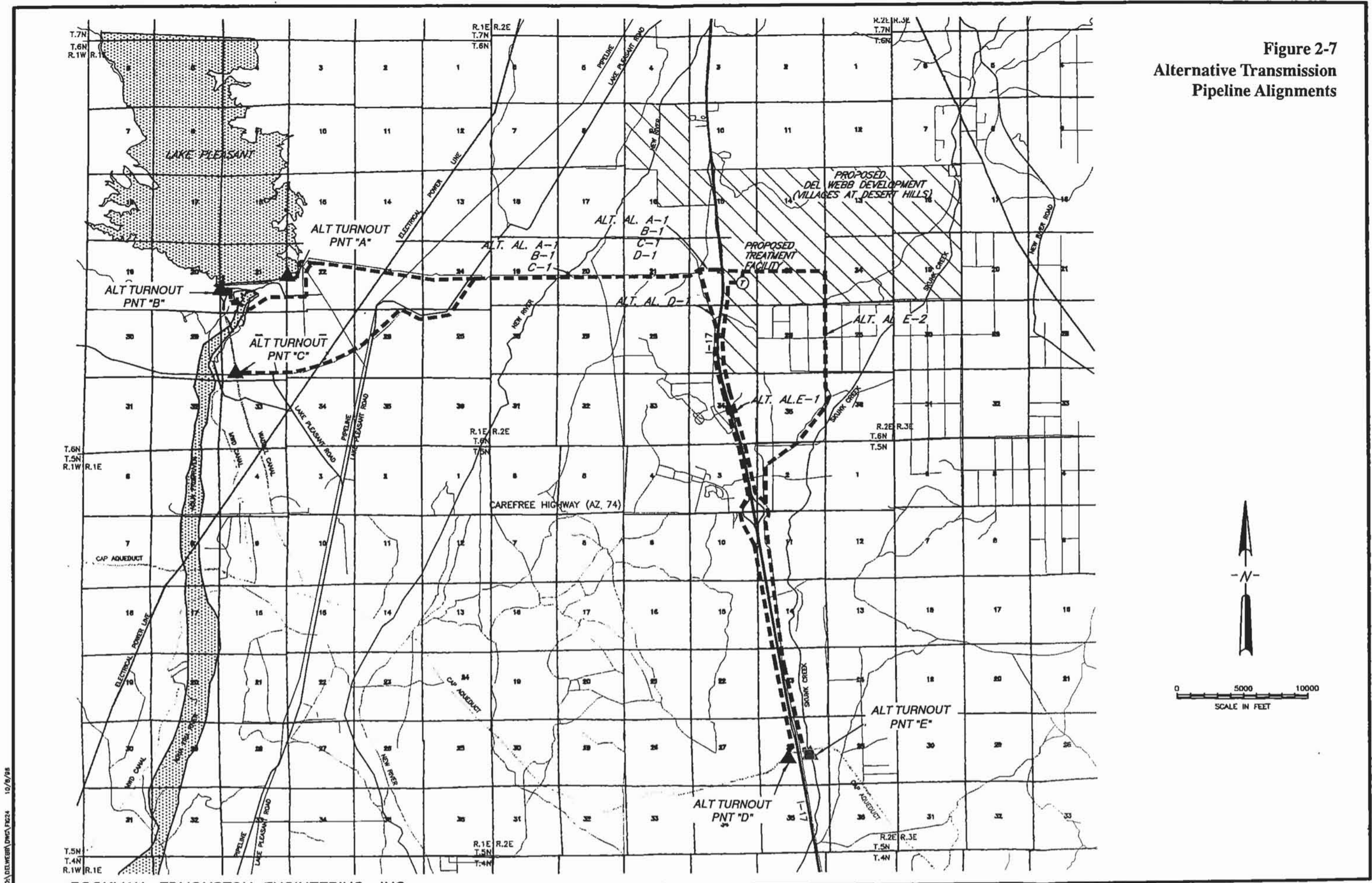
- constructability of the turnout structure and pipeline,
- permit requirements,
- construction schedule,
- ROW issues,
- water supply reliability and quality issues, and
- costs.

Each alternative offered different advantages and disadvantages. Table 2-1 is a summary of the feasibility evaluation conducted for each alternative. The first level of analysis in Table 2-1 identifies relative constructability issues, regulatory and ROW issues, water supply reliability and quality, and schedule considerations. The second level evaluates alternatives based on pumping requirements and number of pumps and pipeline length and diameter needs. Level three shows the relative costs associated with each alternative. Based on the data in levels one, two, and three, the alternatives were ranked. The first category provides ranking in terms of project implementation costs only. The second provides ranking on the basis of total project costs which include the pumping plant power costs over the assumed 45-year life cycle of the facilities. The third ranking considers constructability, ROW and permitting issues. The overall ranking for the alternatives considers all data collected for all of the evaluation criteria including costs.

The feasibility study concluded that Alternative Alignment C was the most feasible, although its costs were not the lowest. Other issues, such as optimal use of previously disturbed areas, constructability, and ROW opportunities, were the main criteria used to select Alternative C. Alternative C was later modified to adjust the turnout point at Waddell Canal to its present location; therefore, the proposed pipeline system is a modified version of Alternative C. The turnout location on Waddell Canal was moved to its current site because of constructability issues, its location near the APS electric transmission line corridor, and the possibility that environmental issues could be avoided by constructing in or near established corridors. A portion of the proposed pipeline corridor identified under Alternative C was also subsequently realigned after the EA public scoping period to avoid an area that was previously designated as proposed critical habitat for the cactus ferruginous pygmy owl. This proposed designation has since been eliminated, but the realigned portion, as shown in Figure 2-2, is still considered part of the proposed pipeline corridor. The original pipeline corridor that is not considered in detail in this EA would have extended along the abandoned Reclamation haul road from the middle of Section 19 east to I-17.

Alternative alignments A, B, D, and E were eliminated from detailed consideration because of excessive construction costs, difficult pipeline corridor terrain, and lack of established ROWs in which to conduct construction activities. Alternative water system delivery alignments considered during the detailed feasibility analysis are not evaluated in detail in this EA because these alternative alignments only partially meet Del Webb's technical and economic selection criteria, as shown in Table 2-1, and were found to be less environmentally preferable than the proposed pipeline corridor.

Figure 2-7
Alternative Transmission
Pipeline Alignments



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Table 2-1. Summary/Evaluation of Alternative Alignments, CAP Water Supply, Water Facilities and Alignments

	Alternative					
	A-1	B-1	C-1	D-1	E-1	E-2
Evaluation Criteria						
Constructability - intake/pumping plant	Very difficult; caisson and intake pipe construction in lake	Moderately difficult; tap into penstock pipe; hard rock area	Minor difficulty; need coffer dam for canal breach	Minor difficulty; need coffer dam for canal breach	Minor difficulty; need coffer dam for canal breach	Minor difficulty; need coffer dam for canal breach
Constructability - pipeline	First 2,000 feet difficult; hard rock; New River crossing and I-17 crossing with bore and jack	First 5,000 feet difficult; hard rock; requires crossing of Lower Lake/New River crossing/I-17 crossing with bore and jack	Crossing of Lake Pleasant Road, New River crossing and I-17 crossing with bore and jack	Carefree Highway crossing; crossing steep hill; hard rock area and Deadman Wash crossing	Carefree Highway crossing; crossing steep hill; hard rock area; Deadman Wash crossing; and I-17 crossing with bore and jack	Carefree Highway crossing; crossing steep hill; hard rock area; Deadman Wash crossing; and construction in improved rights-of-way (ROWs)
Clean Water Act compliance ^a	Individual Section 404 permit plus Nationwide Section 404 permit	Individual Section 404 permit plus Nationwide Section 404 permit	Nationwide Section 404 permit	Nationwide Section 404 permit	Nationwide Section 404 permit	Nationwide Section 404 permit
Special construction and/or salvage techniques	Required	Required	Required	Required	Required	Required
Land ownership within required ROW	Federal; state; ADOT; and private	Federal; state; ADOT; and private	Federal; state; ADOT; and private	State; ADOT; and private	State; ADOT; and private	State; ADOT; and private
ROW issues	Lake area; federal ownership (BLM); restricted access to County Regional park; aesthetic conditions and restrictions; state lands ROW acquisition process takes a minimum of 1 year	Encroachment of CAWCD facilities; approval difficult; state lands ROW acquisition process takes a minimum of 1 year	State lands ROW acquisition process takes a minimum of 1 year	State lands ROW acquisition process takes a minimum of 1 year	State lands ROW acquisition process takes a minimum of 1 year	State lands ROW acquisition process takes a minimum of 1 year
Water supply availability and reliability	Good; large fluctuation in lake water level	Good	Good	Good	Good	Good
Water supply quality	Least desirable	Some minor problems	Some minor problems	Some minor problems	Some minor problems	Some minor problems
Time implementation schedule	2 years	2 years	2 years	2 years	2 years	2 years
Water Facility Requirements						
Pumping cycle	24-hour	24-hour	24-hour	24-hour	24-hour	24-hour
Estimated pipeline length	40,570	48,890	42,240	45,700	39,300	49,200
Recommended pipeline diameter	30	30	30	30	30	30
Recommended number of pumps	4	4	4	4	4	4

Table 2-1. Continued

	Alternative					
	A-1	B-1	C-1	D-1	E-1	E-2
Project Implementation Costs						
Construction and ROW costs	\$5,952,998	6,442,718	5,453,866	5,761,208	5,133,811	6,162,519
Administrative, engineering, and construction management costs	2,018,015	2,142,893	1,890,736	1,969,106	1,809,122	2,071,442
Contingency - 25%	<u>1,488,250</u>	<u>1,610,679</u>	<u>1,363,466</u>	<u>1,440,302</u>	<u>1,283,453</u>	<u>1,540,630</u>
Project implementation costs	9,459,263	10,196,290	8,708,068	9,170,616	8,226,386	9,774,591
Power costs - present value (45-years)	<u>1,654,695</u>	<u>1,686,186</u>	<u>2,652,884</u>	<u>2,683,949</u>	<u>2,660,224</u>	<u>2,851,138</u>
Total project costs	\$11,113,958	\$11,883,476	\$11,360,952	\$11,854,565	\$10,886,610	\$12,625,729
Ranking						
Economic ranking - implementation costs	4	6	2	3	1	5
Economic ranking - total project costs	2	4	3	5	1	6
Constructability	6	5	1	3	4	2
Overall ranking	6	5	1	3	2	4

Notes:

- 1 = lowest implementation and total project costs and highest constructability.
6 = highest implementation and total projects costs and lowest constructability.

* The evaluation of probable Clean Water Act compliance is based on analysis conducted as of March 1996 and does not reflect recent revisions to the nationwide permit program. A Section 404 individual permit would be required for the pipeline project.

Source: Bookman-Edmonston Engineering, Inc. 1996.

An additional Lake Pleasant turnout alternative was also investigated; however, it was dropped from further consideration because of noise and recreational effects on Lake Pleasant.

