2.0 INTRODUCTION

The Project has evolved over four decades as a major infrastructure initiative to identify and secure a long-term water supply for the parched lands of the eastern portions of the Navajo Reservation and the City of Gallup. Planning has progressed under guidance of a local steering committee, and in collaboration with Reclamation and the BIA. Project participants anticipate agreement between local, tribal and federal agencies on the technical, biological, financial and other parameters of the Project. This agreement will clear the way for Congress to authorize the construction the Project. This technical memorandum is focused on the region's municipal water needs. It is not intended to quantify the water claims of any of the parties.

To improve the health and standard of living of those residing in Navajo Nation communities and to serve the future demographic and economic growth of both the City of Gallup and the Navajo Nation, a long-term, high quality, domestic water supply is needed. This technical memorandum presents Project alternatives to move the Navajo-Gallup Water Supply Project from open-ended planning to construction authorization.

This Project is designed to provide a forty-year water supply to the Navajo Nation and the City of Gallup. The Project will deliver water to more than 20 Navajo public water supply systems in New Mexico and Arizona, and the Navajo Agricultural Products Industry (NAPI). For planning purposes, the study area is the New Mexico portion of the Navajo Nation, the Window Rock area within Arizona, and the City of Gallup, New Mexico. Within the State of New Mexico, the study area is encompassed by the State's Water Planning Regions 2 and 6 (Table 5.1 includes a complete list of the Chapters within the Project service area). Along with greater economic opportunity in the Gallup area, the Project will improve the municipal water supply to Navajo economic development growth centers in Window Rock, Tohatchi, Crownpoint and Shiprock.

By the year 2040 the projected municipal demand in the service area (including NAPI) is approximately 52,000 acre-feet per year. This projection does not include any major industrial uses. The Project's annual diversion from the San Juan River will be approximately 36,600 acre-feet and its annual depletion will be 34,700 acre-feet. In addition to the San Juan River depletion, the Navajo Nation will supply an additional 3,200 acre-feet of groundwater annually and the City of Gallup will supply an additional 1,400 acre-feet of groundwater. The Animas La Plata Project will divert an additional 4,680 acre-feet to the Shiprock area.

Because the location of the proposed points of diversion have critical hydrologic implications for the endangered species in the San Juan River (which have yet to be fully evaluated), this technical memorandum presents two distinct alternatives. The first alternative, which is shown in Figure 2.1, diverts water directly out of the San Juan River below the confluence of the La Plata and San Juan Rivers. This configuration is referred to as the San Juan River Diversion Alternative. This configuration is very similar to the "San Juan Alignment" described in the 1984 Environmental Statement. The second alternative, which is shown in Figure 2.2, utilizes the Navajo Indian Irrigation Project (NIIP) Main Canal to divert water from Navajo Reservoir. This configuration is referred to as the NIIP Alternative. It is similar to the "Cottonwood Alignment" described in the

1984 Environmental Statement. Analyses of the no-action and non-structural alternatives are beyond the scope of this document.

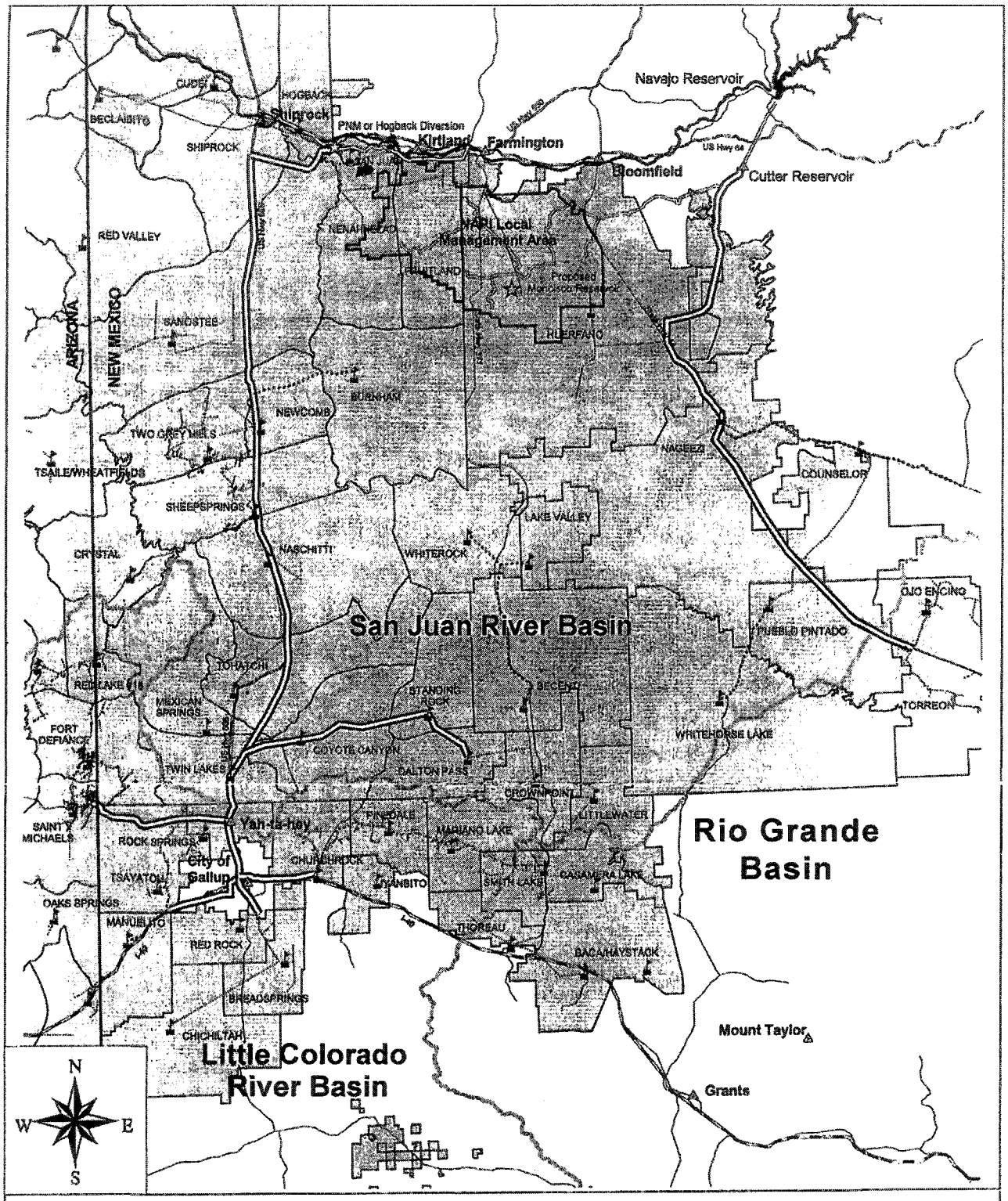
Section 3 of this technical memorandum presents a comprehensive Project history. The history includes a literature review and descriptions of the Project alternatives that have been previously evaluated. Section 4 presents the projected water demand and Section5 presents the current water production in the region. Current water sources will be unable to meet the future demand. Section6 presents water conservation options and Section 7 presents potential surface water supply options for the Project. Section 8 presents two Project alternatives (the San Juan River Diversion Alternative and the NIIP Alternative). Section 9 presents the unit cost of the Project water. And, Section 10 presents a plan of approach and time-line.

2.1 The Navajo Nation Background

The Navajo Reservation was established in 1868, and expanded through a series of executive orders, public land orders, and congressional statutes, to become the largest Indian reservation in the United States. Larger than the State of West Virginia, the Navajo Nation coves an area of approximately 27,000 square miles including portions of Arizona, New Mexico and Utah. The Navajo Nation is divided into 110 chapters, which are areas of local government. According to the 1990 Census the on-reservation Navajo population was 155,876 (Rodgers 1993).

Even after more than 100 years of federal trusteeship, the Navajo Nation faces serious economic and social challenges. In 1997 the Navajo Division of Economic Development observed that the Navajo median family income was only $11,885 while the U.S. median family income was more than $30,000. The average per capita income for the Navajo Nation was less than $5,600 while the average per capita income for the State of Arizona was approximately $22,000. More than 50 percent of the Navajo families on the Reservation lived below the federal poverty levels, compared with less than 13 percent of the general U.S. population. This poverty rate is one of the worst in the United States, even among American Indians. The Navajo unemployment rate on the Reservation is 58 percent, while the unemployment rate for the U.S. is approximately 5 percent. These disparities show no sign of narrowing. Even while the regional economy has boomed, these gaps in income, unemployment, and poverty have widened.

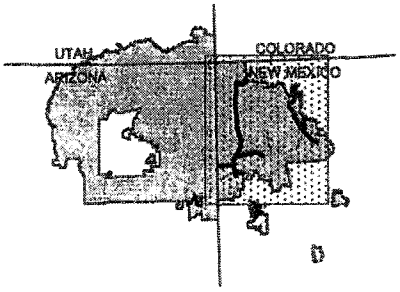
The Navajo Nation also faces serious water resource problems. Many homes lack indoor plumbing. More than 50 percent of Navajo homes lack complete kitchens and more than 40 percent of Navajo households rely solely on water hauling to meet daily water needs. Data from the Navajo Tribal Utility Authority (NTUA) and others demonstrate that Navajo's use far less water per capita yet pay among the highest water rates in the region. The low per capita water use is part of a larger pattern of a low economic standard of living.



Legend

- Chapter Houses
- Towns
- Farmington-Shiprock Pipeline
- SJR-Hogback Alternative
  - Main
  - Future
- NIIP Main Canal
- NTUA Existing Lines
- NAPI LMA Boundary
- San Juan River
- Watershed Boundary
- Chapter Boundaries

Vicinity Map



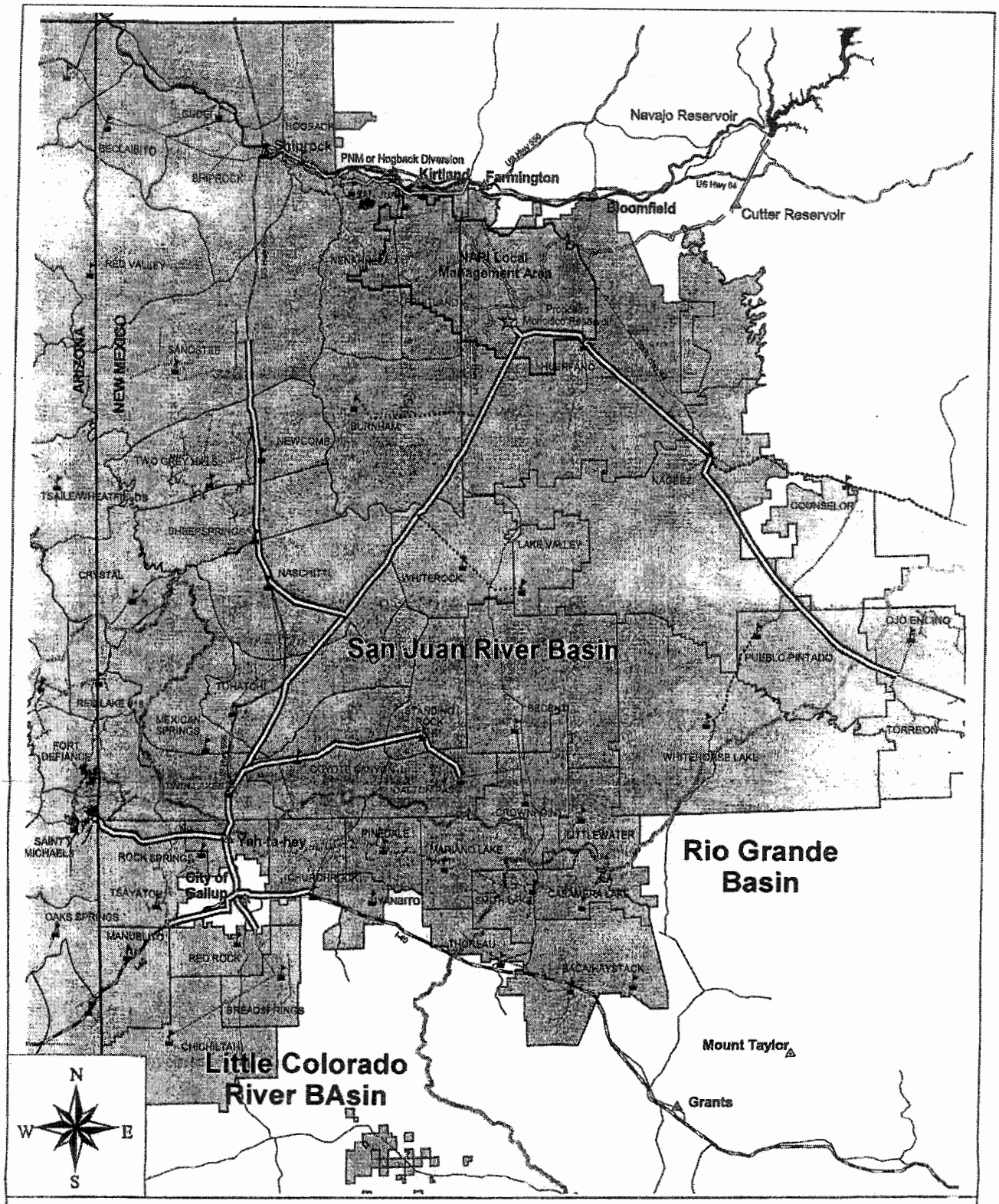
Navajo - Gallup Water Supply Project

Navajo Nation
Department of Water Resources
P.O. Drawer 678
Fort Defiance, Arizona 86504
(520) 729-4004

c:/robert/projects/ngwsp3.apr
by: R. L. Kirk

Figure 2.1
SJR Alternative

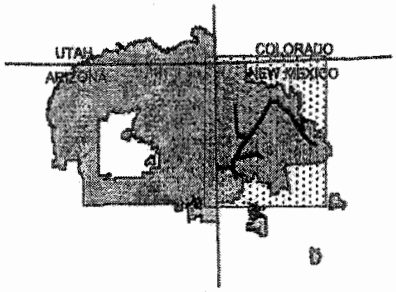
March 16, 2001



Legend

- Chapter Houses
- Towns
- Farmington-Shiprock Pipeline
- NIIP Alternative
- Future
- Main
- NIIP Main Canal
- NTUA Existing Lines
- NAPI LMA Boundary
- San Juan River
- Watershed Boundary
- Chapter Boundaries

Vicinity Map



Navajo - Gallup Water Supply Project

Navajo Nation
Department of Water Resources
P.O. Drawer 678
Fort Defiance, Arizona 86504
(520) 729-4004

c:/robert/projects/ngwsp3.apr
by: R. L. Kirk

Figure 2.2
NIIP
Alternative

March 16, 2001

Navajo-Gallup Water Supply Project

Safe drinking water is a precondition for health promotion and disease prevention. The lack of clean safe water results in a higher incidence of disease, poor health, and inadequate fire protection. In 1996, President Clinton noted that "the number one health problem in the developing world is the absence of clean, safe water." Children living in homes without access to safe, affordable, and dependable drinking water are especially vulnerable. Without access to safe drinking water, people are forced through a revolving door of expensive medical treatment and unhealthy conditions. In a report to Congress by the Comptroller General, it was noted that families living in homes with satisfactory environmental conditions placed one fourth of the demands on Indian Health Service (IHS) primary health care delivery systems than families living in homes with unsatisfactory conditions. Biological contaminants such as coli form bacteria, giardia, and *crypto-sporidium* can only be controlled by proper water source protection, treatment, and distribution systems.

These grim statistics adversely impact the survival of the Navajo Nation. According to the Division of Community Development, due to the stagnation of development in Navajo country, the Navajo Nation is losing population to off-reservation communities, the Four Corners Area, and the remaining 46 states. Between 1980 and 1990, the Navajo off-reservation population in New Mexico, Arizona, and Utah grew by 125 percent, the Navajo population in the other 47 states grew by 71 percent, while the on-reservation population grew by only 22 percent. Without reducing the out-migration, by 2012 more than half of the Navajo people may be living off of the Navajo Reservation (Rodgers, 1993).

The lack of infrastructure, the lack of economic development and the sustained poverty are closely connected. Throughout the arid southwest, and especially on the Navajo Nation, a reliable water supply is essential for stimulating and sustaining economic development. The Navajo Nation has identified economic development growth centers throughout the Reservation. These economic development centers represent large population bases that have the potential to benefit from an economy of scale in infrastructure development. Accordingly the Navajo Nation will focus resources in these locations to stimulate economic growth.

Creating an adequate water infrastructure does not guarantee sustained economic growth, nor a narrowing of the disparities between the Navajo people and the rest of the United States. It is however, a necessary prerequisite. If an improved water infrastructure could create even modest improvements, the benefits will be compounded. For instance, the Navajo Nation captures less than 8 percent of the $660 million annual tourism revenue in the Four Corners Area. If an enhanced tourist infrastructure increased that percentage to 12 percent, the Navajo Nation's economy would benefit from an additional $26 million annually. If an improved water infrastructure can close the income gap between the Navajo and the U.S. average by just one percent, the direct benefits will be worth tens of millions of dollars annually. Without this Project the Navajo economy will continue to stagnate.

2.2 The City of Gallup Background

The City of Gallup was established in the 1880's as a small company headquarters for the Atchison, Topeka and Santa Fe Railroad. Initially the town's economy was supported by coal mining in the region. The City of Gallup became a regional trade center for the surrounding area, including the Navajo Nation which borders most of the City's geographic boundary. Today, the City's population exceeds 23,000 and it continues to serve as an economic center for more than 100,000 people. The City relies solely on a groundwater supply that is being progressively mined with little recharge into the source aquifers. Current hydrologic projections by the City predict severe shortages in the groundwater supply within 10 years. This projected shortfall will have severe economic and social impacts on the City of Gallup and the surrounding Navajo Chapters.

The Navajo land near the City of Gallup has been explicitly included in this Project service area.. This area includes the Chapters of Bread Springs, Chichiltah, Church Rock, Iyanbito, Manuelito, Pinedale, Red Rock, Rock Springs, and Tsayatoh. Project water will be conveyed through the municipal system of the City of Gallup to the surrounding NTUA systems and, under some circumstances, to individual water users.

2.3 The Navajo Agricultural Products Industry

The Navajo Agricultural Products Industry (NAPI) is a tribal enterprise, which was created in 1970 to develop, farm, and operate the Navajo Indian Irrigation Project (NIIP) lands, and operate and maintain the NIIP water delivery system. NAPI currently produces a variety of crops including corn, potatoes, alfalfa, pinto beans, and others. Its crops are marketed throughout the United States, Mexico, and other international markets under the "Navajo Pride" trademark. NAPI provides approximately 250 permanent jobs and up to 800 seasonal jobs during peak seasons. Subcontractors, joint venture partners, and independent truckers employ additional workers. In 1999, NAPI farmed 64,000 of the 110,630 acres to be developed. NAPI channels $55 million annually into the Navajo Nation's economy.

Both Project alternatives will provide additional industrial water for the NAPI. The Project alternative that utilizes the NIIP Canals would be closely integrated with NIIP canal operation. The conveyance of municipal water may provide significant benefits to both NIIP and the Project. The thoughtful sequencing of construction, operation and maintenance, and financing could benefit NAPI and the Project. However, hydrologic constraints created by the Endangered Species Act may preclude the use of the NIIP canals for the Project.