ATTACHMENT J

Screening Report

Attachment J

SCREENING REPORT

PURPOSE

This screening report summarizes the alternatives that were considered for (1) addressing the Navajo-Gallup Water Supply Project (proposed project) need, (2) screening methodology, and (3) reasons that some alternatives were eliminated. The purpose of the screening analysis was to focus subsequent analyses on alternatives that had the best chance of achieving the project goal with the fewest significant negative impacts, including cost. The goal of the proposed project (the alternatives) is to provide an adequate water supply for projected 2040 population growth and economic development in the eastern section of the Navajo Nation, city of Gallup, and the Teepee Junction area of the Jicarilla Apache Reservation.

SCREENING PROCESS

Some options were eliminated from consideration before the screening process began because, among other reasons, they would not have the ability to adequately and reliably provide the amount of quality water necessary for the projected population growth and they would be too costly. For example, under conditions affecting the Navajo Nation and the city of Gallup, most of the aquifers previously investigated were found to be unable to meet long-term municipal development because of the harmful impacts of continued over-drafting of the groundwater. It is assumed these groundwater sources would be used, where possible, in conjunction with surface water to meet the long-term water demand. On the Jicarilla Apache Reservation, previous planning efforts included investigating the possibility of diverting water from the Navajo River and pumping water to southern parts of the reservation. However, a pipeline project from these sources was found to be too costly.

For the overall project area, such nonstructural options as water conservation, water re-use, conjunctive use of groundwater, and aquifer storage were considered but eliminated. Water re-use and groundwater recharge would not provide additional water supplies. Water conservation is already maximized in the proposed project area and all of the alternatives assume water conservation will continue. In addition, the nonstructural alternatives would not supply enough water for future use. Action

alternatives for both 2020 and 2040 capacities were evaluated even though only the 2040 alternatives meet the proposed project need. This was done to help answer questions relating to decreasing the cost of the proposed project by reducing its size.

The set of alternatives that went through a formal screening process were developed in part with public input (scoping meetings), informal public contacts, coordination with other entities, and interagency consultations. A project Steering Committee has been in existence since the early 1990s to guide the proposed project's development and is composed of representatives and their technical experts from the Navajo and Jicarilla Apache Nations, city of Gallup, State of New Mexico, North West New Mexico Council of Governments, Navajo Tribal Utility Authority (NTUA), Indian Health Service, Bureau of Indian Affairs, and the Bureau of Reclamation (Reclamation). The steering committee contributed to the screening process.

The screening process began with the evaluation of eight alternatives. Six of the alternatives were structural, including the San Juan River Public Service Company of New Mexico (SJRPNM), San Juan River Infiltration, Navajo Indian Irrigation Project (NIIP) Moncisco, NIIP Coury Lateral, NIIP Cutter, and NIIP Amarillo Alternatives' configurations. The other two alternatives were the nonstructural Water Conservation Alternative and the National Environmental Policy Act (NEPA)-required No Action Alternative. The plan selection process, or screening, included two categories of screening criteria: the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (Principles and Guidelines*) four tests of viability and nine factors covering the four accounts: national economic development (NED), regional economic development (RED), environmental quality (EQ), and other social effects (OSE). Within the two categories of screening criteria, there were four independent screening analyses (or steps) to arrive at the final alternative scoring and ranking.

First, all eight alternatives were initially screened using the *Principles and Guidelines'* four tests of viability (acceptability, efficiency, effectiveness, and completeness), including the six structural alternatives at the year 2040 design capacity and the smaller year 2020 design capacity. The six 2020 design capacity alternatives and the two nonstructural alternatives, Water Conservation and No Action, did not meet the four tests of viability and, as a result, were eliminated from further screening. The No Action Alternative is required by NEPA to be analyzed in the planning report/draft environmental impact statement. The result was that the six 2040 design capacity alternatives were carried forward for a more detailed comparison for screening.

The next level of screening, in part to meet the *Principles and Guidelines*' four account requirements, included a comparison of the total costs of each alternative as measured by its present worth, or cost-per-acre-foot of water value. The *Principles and Guidelines*

require Reclamation to evaluate the effects of the alternatives in the areas of the four accounts, particularly NED. The alternative chosen must maximize economic benefits. Analysis of the SJRPNM and NIIP Amarillo Alternatives showed that they had the greatest economic benefit of the six alternatives.

Nine screening factors were developed by the project Steering Committee to be used in the next two screening stages. The alternatives were screened by nine broad-ranging factors that relate to the broader *Principle and Guidelines'* four tests of viability and four accounts definitions. Another analysis screened the alternatives by only four of the environmental factors out of the nine total factors. The result was that only two alternatives scored well enough to be carried further into the impact analysis in chapter V—the SJRPNM and NIIP Amarillo Alternatives. Of those two, the SJRPNM Alternative had the best overall score. The NIIP Amarillo Alternative had very comparable present worth values to the SJRPNM Alternative and actually scored higher, assuming the use of locally available NTUA electric rates.

SCREENING CRITERIA AND PROCESS

The screening criteria included an initial screening for meeting the four tests of viability. The result was that the six action alternatives were carried forward for a more detailed screening or comparison. The next level of screening included a comparison of the total costs of each alternative as measured by its present cost-per-acre-foot value. The other screening process included screening the alternatives using the factors by assigning rating numbers, weights, scores, and then finally ranking the alternatives' results.

The Principle and Guidelines

Four Tests of Viability

The *Principles and Guidelines* describe four overarching tests of viability to be considered for each alternative. The tests assess the completeness, effectiveness, efficiency, and acceptability of the alternative plans. Alternatives that met a minimum standard under all four tests were considered viable plans and were investigated in greater detail.

> ***Completeness –*** This factor measures the extent to which a given alternative plan provides and accounts for all necessary investments or other actions to ensure the realization of the planned effects. This may require relating the plan to other types of public or private plans if the other plans are crucial to realization of the contributions to the objective.

Effectiveness – This factor measures the extent to which an alternative plan alleviates the specified problems and achieves the specified opportunities.

Efficiency – This factor measures the extent to which an alternative plan is the most cost-effective means of alleviating the specified problems and realizing the specified opportunities and is consistent with protecting the Nation's environment.

Acceptability – This factor measures workability and viability of the alternative plan with respect to acceptance by State and local entities and the public and compatibility with existing laws, regulations, and public policies.

Table IV-3 displays the results of applying the four tests of viability to the eight alternatives. The No Action and Water Conservation Alternatives did not meet the *Principles and Guidelines*' four tests of viability; therefore, the Water Conservation Alternative was screened out and the No Action Alternative was retained solely to meet NEPA plan formulation requirements. Additionally, although the year 2020 design capacities for the six structural alternatives are not shown in table IV-3, they were found to be incomplete, ineffective, and unacceptable because they did not meet the proposed project's objective of providing a municipal and industrial water supply for the year 2040.

The Four Accounts

The four accounts specified in the *Principles and Guidelines* are used to evaluate information on the effects of viable plans—NED, EQ, RED, and OSE accounts. Each account describes particular aspects of anticipated effects of the viable alternatives on the economy and environment.

The NED account measures changes in the economic value of the national output of goods and services, while the RED account gauges changes in the distribution of regional economic activity. The EQ account measures significant effects on natural and cultural resources, and the OSE account measures effects from perspectives that are relevant but not reflected in the other three accounts. The *Principles and Guidelines* require that the plan chosen must maximize net NED benefits as the preferred alternative, or else Reclamation must obtain an exception from the Secretary of the Interior to formulate a plan to meet other needs. The economic benefits of each alternative are essentially the same; therefore, the alternative with the smallest present worth value (also referred to as the total project cost measured in terms of cost per acre-foot of water) would represent the alternative that maximized NED benefits.

Comparison of Total Costs

The next level of screening included a comparison of the total costs (capital, construction, and operation, maintenance, and replacement [OM&R] costs) of each alternative as measured by its present worth per acre-foot. This process satisfies requirements for the NED—the most critical of the four *Principles and Guidelines'* accounts. The present worth analysis was done using the following conditions:

(1) 50-year life of the proposed project

(2) An interest rate of 6.37 percent

(3) OM&R cost estimates using Colorado River Storage Project (CRSP) and NTUA power rates

(4) Construction costs at October 2001 price levels

Results of the comparative analysis, displayed in table IV-4, show the alternatives ranked from highest to lowest cost, including their total estimated costs. Results of this comparative analysis show that the SJRPNM and NIIP Amarillo Alternatives have the lowest present worth. The SJRPNM Alternative is the lowest using CRSP power rates, and the NIIP Amarillo Alternative is the lowest using NTUA power rates. The economic benefits of all the 2040 alternatives are essentially equal for this project; therefore, the present worth is considered reflective of the NED account.

Screening Factors

Alternatives were weighted for each screening factor for comparing the alternatives in a consistent manner. The factors are defined in this section, and the weighting process is described in the next section. The nine factors identified for comparing and screening the alternatives are:

(1) Capital cost per acre-foot of delivered water

(2) OM&R cost per acre-foot of delivered water

(3) Impacts to endangered species

(4) Impacts to environmental resources (aquatic, wildlife, vegetation, land use, and recreation; endangered species are excluded)

(5) Impacts to cultural resources

(6) The quality of drinking water provided

(7) Social/economic impacts

(8) Acceptability to project beneficiaries

(9) Risks associated with construction, implementation, and operation and maintenance

Definitions and components of the nine factors are shown in table J-1.

Alternative Ranking Process

Two screening analyses were conducted independently for the 6-year 2040 structural alternatives—a weighting of all nine evaluation factors and another conducted for only four of the nine factors, referred to as the environmental factors (endangered species, environmental resources, socioeconomics, and cultural resources). The environmental factors were evaluated independently to help identify the least environmentally impacting alternative primarily for NEPA requirements.

Within each of the two screening analyses there were four primary steps to arrive at the overall ranking of alternatives from high to low impacts that incorporated the nine factors:

Step 1 (Rating)	Each alternative was assigned a numerical rating (1–12) for each factor by technical experts from the Steering Committee, with 12 being the least impacting or costly based on the nine (or four environmental) factors.
Step 2 (Weighting)	Each factor was given a weight of importance by the same group.
Step 3 (Scoring)	The nine (or four environmental) factors' products of each alternative rating and each factor weight were added together to produce the alternative's overall score.
Step 4 (Ranking)	The rating of each alternative was multiplied by the weight of each of the nine (or four environmental) factors.

Table J-1.—Definitions and components of the nine screening factors

1. Capital cost[1]				
Construction	Land, relocation, and associated damage	Environmental mitigation	Protection of cultural resources	
2. OM&R				
Personnel		Power	Material and equipment	
3. Endangered species				
Endangered aquatic resources[2] Colorado pikeminnow Razorback sucker		*Wildlife resources* Southwestern willow flycatcher Bald eagle Golden eagle Ferruginous hawk nesting habitat	*Vegetation resources* Number of populations of Mesa Verde cactus disturbed or removed	
4. Environmental resources				
Aquatic Native and trout fisheries Aquatic insects Zooplankton Others dependent on lotic and lentic habitats	*Land use* Physical size of land used for the proposed project	*Vegetation* Upland area disturbed Upland area removed Riverine habitat disturbed Riparian shrub removed Number of bisti fleabane populations potentially disturbed Aztec gilia acres removed Number of San Juan milkweed populations disturbed and removed	*Wildlife resources* Potential to remove large cottonwoods used by raptors Area required for structures for potential raptor nesting/feeding habitats Miles of transmission line	*Recreation* *Tailwater fishing* Flyfishing Wade-fishing Dory fishing Commercial guide and outfitting Others *River recreation* Fishing Rafting Commercial guiding and outfitting *Reservoir recreation*
5. Cultural resources[3]				
Historic or archaeological resources and traditional cultural properties (TCPs) Culturally significant landscapes Prehistoric and historic archaeological sites and isolated artifacts or features Historic structures Human burials Sacred sites Areas of important cultural value to existing communities (TCPs)				

Table J-1.—Definitions and components of the nine screening factors (continued)

6. Drinking water quality[4]			
Total dissolved solids		Contamination from other sources (waste water, etc.)	Sulfates (salts)
7. Socioeconomics[5]			
Construction Temporary infusion of money into the local economy		*Drinking water availability* Would be a positive impact to areas that do not currently have adequate supplies Positive health and economic impacts expected	
8. Acceptability			
Cost	Political acceptability	Impacts to existing resources and infrastructure	Full supply of water and maintaining continuous operations
9. Risk			
Constructability Standard/typical construction methods Proven technology Availability of field conditions Geologic formations Safety to the public Availability of technology High degree of unknowns such as geologic formations, permeability of river gravels, foundation conditions for a dam, rock encountered during construction, saturated conditions		*Reliability* Dependence on NIIP infrastructure Ability to deliver water without interruption Control of changing conditions over time Quantity of mechanical and electrical equipment Water quality (sediment)	

[1] The cost level for comparison was October 2001 and was broken down into cost per acre-foot so that the 2020 and 2040 alternatives could be compared.
[2] Measured in miles of critical habitat that would experience increased flows and the change in average minimum flows for each alternative.
[3] Cultural resources are physical or other expressions of human activity and, if eligible for inclusion in the *National Register of Historic Places*, are protected under the National Historic Preservation Act of 1966, as amended in 1992, and may also be protected under the Native American Graves and Repatriation Act of 1990; the American Indian Religious Freedom Act; Executive Order 12007, Protection of Native American Sacred Sites; and other State, agency, or Tribal laws and policies.
[4] Sedimentation was not considered because it can be handled by the treatment process.
[5] Factors that impact the social setting or economy.

Step 1 – Alternative Rating Process

(1) *Capital Costs Factor* – Each alternative was assigned a rating from 1–12, with the least cost per acre-foot rated 12 and the most cost per acre-foot rated 1.

(2) *OM&R* – Same as (1).

(3) *Endangered Species* – Aquatic, wildlife, and endangered species were considered. Effect values were assigned for each resource, and all resources were weighted equally.

(4) *Environmental Resources* – Aquatic resources (30 percent), land use (5 percent), wildlife (20 percent), vegetation (25 percent), and recreation (20 percent) were considered (the respective weight given to each of the resources is shown in parentheses).

(5) *Cultural Resources* – The cultural resource evaluation used the density of sites, which included archaeological, ethnographic, and in-use sites for comparison of alternatives. The alternative with the least site disturbance was given a rating of 12, and the alternative with the most disturbance was given a rating of 1.

(6) *Drinking Water Quality* – The alternatives providing the best quality of drinking water were given a rating of 12, and the alternatives providing the worst quality of drinking water were given a rating of 1. Water from Navajo Reservoir is of better quality water than water from the San Juan River downstream of the reservoir.

(7) *Socioeconomic* – These are factors that impact social structure or economy of the beneficiaries of the proposed project. Water delivery to the proposed project area is the same for each alternative, and the construction impacts are nearly the same with each alternative. All of the alternatives providing water to the same area and the same quantity would be rated the same. All alternatives were therefore rated the same.

(8) *Acceptability* – This was the project Steering Committee's concept of the preferred alternative. The components of this factor considered were political supportability, impact to existing resources and infrastructure, and compatibility with the future planned development. One rating was given to each alternative, with 12 being the most acceptable and 1 being the least acceptable.

(9) *Risk* – Reliability and constructability were the criteria used with equal weighting. Risk included those variables or unknowns in each alternative that could prevent the complete construction or the continued operation after construction of the proposed project. The alternative with the least risk was given a 12 rating, and the alternative with the most risk was given a 1 rating.

Step 2 – Factor Weight Assignment Process

A weight or percentage of importance was assigned to each of the nine (or four environmental) factors. Importance was assigned based on the factors' relative anticipated importance or impacts if the alternative was implemented. The combined weights totaled 100 percent. This was done for the nine factors as well as the four environmental-only factors; two independent analyses were completed for comparison purposes. The weighting for each factor is shown in table J-2.

Table J-2.—Factor weights

Criteria	Combined weight factors (percentages)	Environmental factors only (percentages)
Capital costs	20	0
OM&R	20	0
Endangered species	20	30
Environmental resources	20	30
Acceptability	2	0
Risk	10	0
Water quality	2	0
Socioeconomics	3	20
Cultural resources	3	20
Total percent	100	100

Step 3 – Scoring: Alternative Rating Multiplied by Factor Weights

This step involved multiplying the alternative ranking (1–12) by the assigned weights to get the numeric score for each alternative for that specific factor. The numeric score for each of the nine (or four) factors was added together to get the total score for each alternative, as shown in chapter IV, tables IV-5 (alternative selection criteria) and table IV-6 (alternative comparison for environmental factors).

Step 4 – Alternative Ranking

This step involved comparing the total alternative scores against each other, with the highest score being the most preferred alternative. The alternatives were rated against each other in a combined resource rank (see tables IV-5 and IV-6).

SCREENING RESULTS

To summarize the options and alternatives originally considered:

- Six structural alternatives to provide surface water supply to meet year 2020 needs were evaluated.
- Six structural alternatives to provide surface water supply to meet year 2040 needs were evaluated.
- Water conservation was considered as a stand-alone alternative.
- Alternatives using groundwater were considered.
- Other water management techniques were considered and water re-use and aquifer storage were considered in combination with the other alternatives.

Water users in the proposed project area currently have a very low consumptive use of water and will have to continue to conserve with or without a new water supply. Both water availability and water cost will force continued water conservation. Therefore, water conservation alone is not a complete alternative, but was part of all alternatives considered.

The proposed project area's groundwater resources are not adequate to provide long-term water needs and, therefore, cannot provide for a complete stand-alone alternative. The existing sustainable groundwater supply is assumed to be needed along with a surface water supply to meet future needs. Alternatives were designed assuming future use of available groundwater.

Water management techniques, like waste water re-use and aquifer storage, are not complete alternatives, but could provide better management of existing water resources. It is expected such techniques would be used by the project beneficiaries to efficiently manage their water.

The alternatives sized to meet year 2020 water demands were evaluated only for comparison of costs. As expected, the unit costs for smaller-sized alternatives were

higher in addition to not meeting the proposed project's long-term water supply purpose. In addition, these alternatives were not acceptable to the project beneficiaries. As a result, they were not carried into the screening process.

The six structural alternatives sized for the year 2040 water demands were taken through the complete screening process, and:

(1) All six alternatives met the *Principles and Guidelines'* four tests of viability.

(2) Present worth (NED) analysis showed the SJRPNM and NIIP Amarillo Alternatives were the highest ranked (least costly).

(3) The nine screening factors revealed that the SJRPNM Alternative was the highest ranked out of the six.

(4) Environmental factor screening (four of the total nine factors) revealed the SJRPNM Alternative, again, was the highest ranked (least impacting to the environment).

The conclusion of this analysis is that the SJRPNM Alternative ranked higher in the overall combined analysis. The NEPA analysis described in chapter V looks at the SJRPNM and NIIP Amarillo Alternatives in comparison with the No Action Alternative.