

Recommended Alternative for Long-Term Water Supply Community of Allison

**Prepared for Northwest New Mexico Council of Governments
Gallup, New Mexico**

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Recommended Alternative for Long-Term Water Supply Community of Allison

1. Background and Overview

This document summarizes the recommendations for providing long-term public water service to the community of Allison in McKinley County, New Mexico (Figure 1). Water service for a number of existing or potential small rural water systems in McKinley County was examined in the report *McKinley County Small Rural Water Systems Appraisal Level Investigation*, prepared by Daniel B. Stephens & Associates, Inc. (DBS&A) in partnership with DePauli Engineering and Surveying Co. The report was published June 9, 2015. The Appraisal Level Investigation was prepared for McKinley County, through the Northwest New Mexico Council of Governments (NWNMCOG) pursuant to the Reclamation Rural Water Supply Act of 2006 (43 USC §§ 2401-2409 (Supp. 2011)) and appraisal criteria included in the U.S. Bureau of Reclamation's (USBR's) Rural Water Supply Program interim final rule (43 CFR Part 404).

2. Existing Conditions

The non-system community referred to as Allison is a 26-acre area located north of Interstate 40 (I-40), approximately ½ mile from the City of Gallup municipal boundary (Figure 1). A survey conducted in 2013 identified approximately 31 existing homes that would require water service (DePauli, 2013b). Those residences currently rely on domestic wells for water supply, some of which are likely shared by more than one home. The New Mexico Office of the State Engineer (OSE) reports 17 domestic wells for the section that includes the Allison area (NM OSE, 2014).

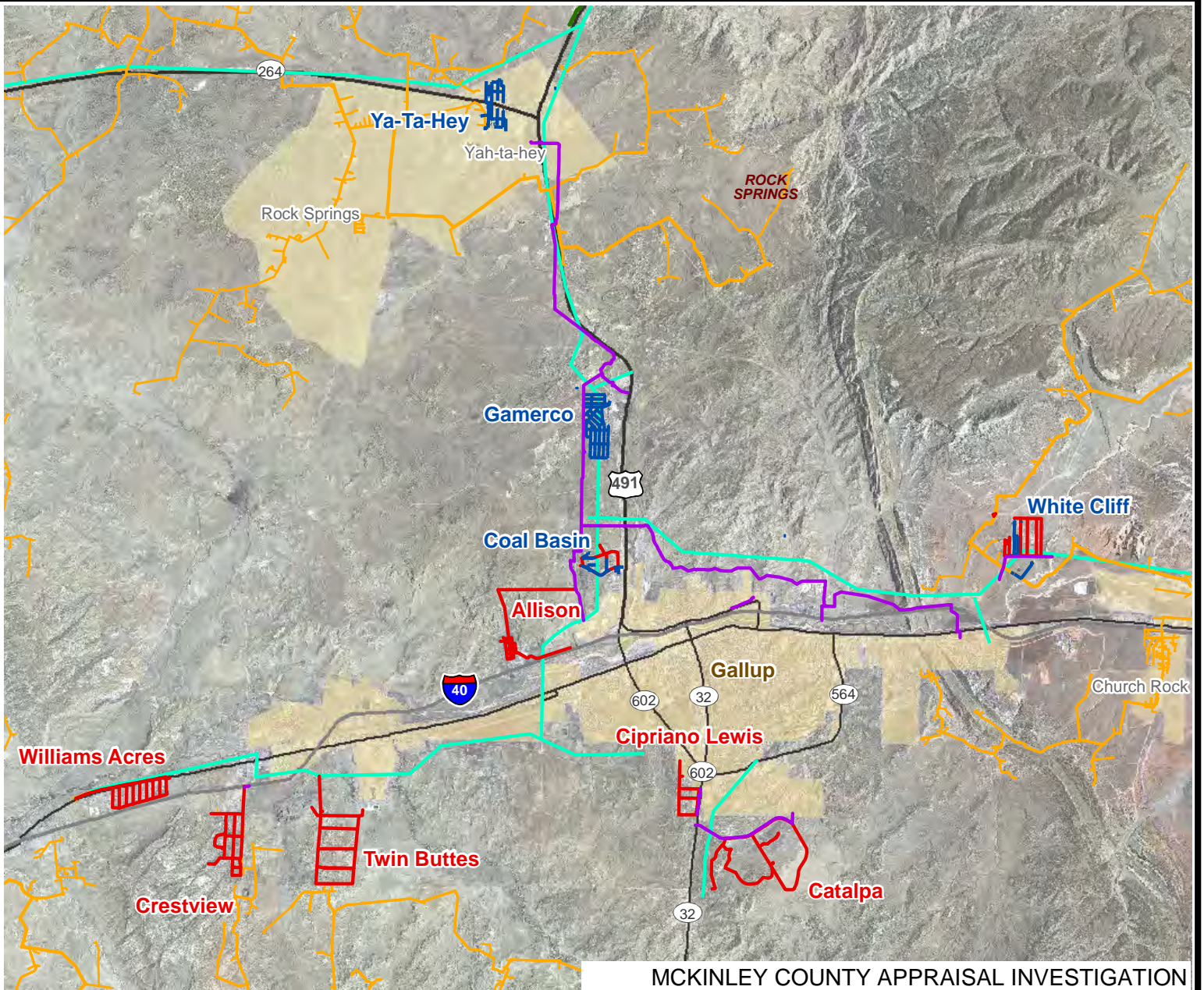
In 1992 Allison residents organized into the Allison Water Association (NMED, 2014), listing a total of 26 connections. A water right application was also filed in 1991, declaring 12 acre-feet for the proposed water system and transferring the water rights into a new well that would be drilled. Supplemental documentation in the OSE files indicates that the transaction was canceled and that the owner had no intention of transferring the water rights to Allison (NM OSE, 2014). The NMED lists Allison as an inactive system (ID #NM3508117) (NMED, 2014).



System	Number of Connections	
	2012	2060
Allison	31	38
Catalpa	97	120
Cipriano Lewis	27	33
Crestview	93	115
Coal Basin	34	42
Gamerco WSD	484	598
Twin Buttes	57	70
White Cliffs	48	59
Williams Acres	180	223
Yah ta hey	125	155
	1,176	1,453

Explanation

- █ **Catalpa** Proposed water lines
- █ **Gamerco** Existing water lines
- Proposed water line
- Existing water line
- San Juan Lateral
- Navajo Tribal Utility Authority pressurized main
- Navajo Gallup Water Supply Pipeline water line



MCKINLEY COUNTY APPRAISAL INVESTIGATION
McKinley County Rural Water Systems and Navajo Gallup Water Supply Project

Figure 1





The estimated current population of Allison is 88, with an estimated water demand of 6,163 gallons per day (gpd), or 6.9 acre-feet per year (ac-ft/yr). Population and water demand estimates and projections are based on 2.84 people per household, and water use of 70 gallons per capita per day.

3. Alternatives Examined

Three alternatives were examined for sustainable domestic water service to homes in Allison: (1) No Action (Groundwater), (2) Connection to the Navajo Gallup Regional Water Supply Project (NGWSP) with a Master Meter, and (3) Connection to the NGWSP with individual meters.

In order to evaluate future infrastructure needs, population and water demand were calculated for the year 2060. It is estimated that in 2060 Allison will have 38 households, 108 people, and an average demand of 7,619 gpd, or 8.5 ac-ft/yr.

3.1 No Action Alternative

The No Action alternative for this community relying on domestic wells assumes that the wells would need to be replaced over time. A replacement supply well would then need to be drilled into the deep aquifer to develop a new single-point drinking water supply for the entire community. The community would organize into an active water system that would own the new infrastructure and oversee system operation and maintenance, billing, and administration.

The proposed improvements specifically include a new water supply well to an assumed depth of 1,800 feet, together with a 3-horsepower pump to provide an average supply of 10 gallons per minute (gpm), a 140,000-gallon steel at-grade water storage tank, disinfection using bulk sodium hypochlorite solution delivered via a dosing pump at the wellhead, and water distribution piping consisting of 9,000 feet of 8-inch C-900 polyvinyl chloride (PVC) water line, 4 feet deep. The proposed storage volume would provide required fire flow of 1,000 gpm for two hours plus two days of storage daily equalization for peak flows. The distribution piping is proposed to be located within existing road right-of-way (ROW), with the new storage tank tentatively located on



the hill to the west and the well on the lower ground nearby. For cost estimating purposes, isolation valves are assumed every 500 feet of distribution line.

3.2 Connection with Master Meter Alternative

The master meter alternative includes the distribution piping system described in Section 3.1, with an additional 1,600 feet of pipeline to the nearby NGWSP transmission line (Reach 27.3). No water storage tank would be required, under the assumption that the supply from the NGWSP line is adequate for peak and fire flow demands. The master meter alternative includes an 8-inch totalizing meter and vault installed near the connection to the NGWSP line. This alternative includes a tap, meter, and meter box for each service connection and eight fire hydrants based on a 400-foot radius between each hydrant.

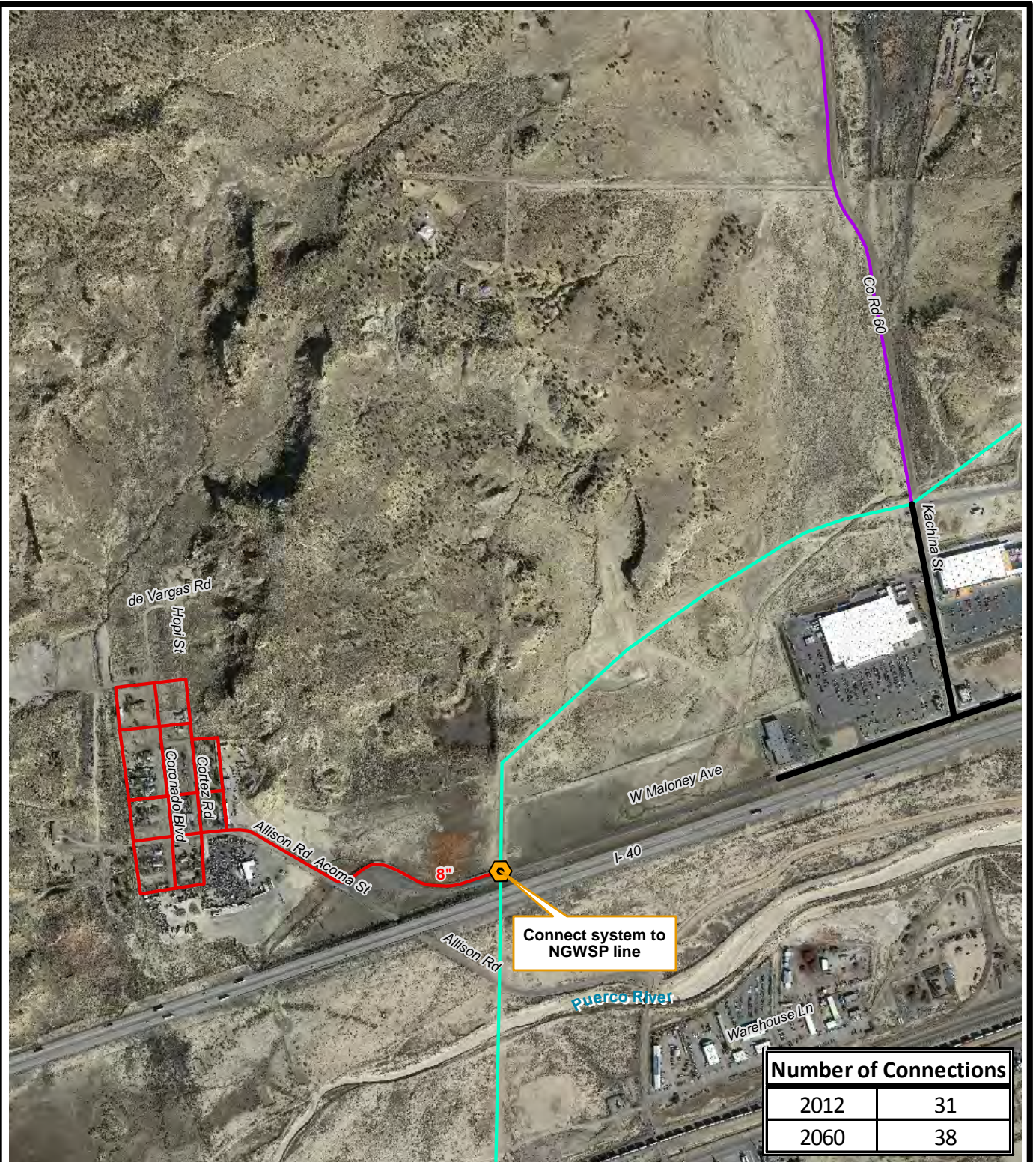
3.3 Connection with Individual Meters Alternative

The connection with individual meters alternative includes the distribution piping system described in Section 3.1, with an additional 1,600 feet of pipeline to the nearby NGWSP transmission line (Reach 27.3). No water storage tank would be required, under the assumption that the supply from the NGWSP line is adequate for peak and fire flow demands. This alternative includes a tap, meter, and meter box for each service connection and eight fire hydrants based on a 400-foot radius between each hydrant.

4. Recommended Project

The alternatives described above were scored based on performance goals that were associated with performance measures and attributes. Scores were assigned from 1 to 100, and criteria were weighted from 1 to 5. The scores for Allison alternatives are provided in Appendix A and are summarized in Table 1. Based on the scoring, the connection alternative with individual meters is the preferred alternative, as shown in Figure 2.

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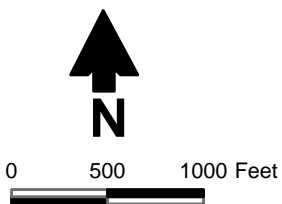
Number of Connections	
2012	31
2060	38

October 2012 aerial photograph from Google Earth

Explanation

- Proposed water system (10,600 ft total pipe length)
- Navajo Gallup Water Supply Pipeline water line (Reach 27.3)
- Proposed Navajo Gallup Water Supply Pipeline water line (Reach 27.9)

- City of Gallup water line
- ⬢ Tie-in



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6/22/2015 JN WR12.0084

**MCKINLEY COUNTY
APPRAISAL INVESTIGATION
Allison Proposed Water System
Preferred Alternative**

Figure 2



Table 1. Alternative Scores

Alternative	Score
No action (groundwater)	1,565
Connection with master meter	2,320
Connection with individual meters	2,830

5. Costs

The estimated capital cost of the preferred alternative is \$713,000. The annual household water cost (which would be billed to households by the City of Gallup) is \$414. The operating and maintenance costs have not been calculated, as they are included in the rates the utility company would charge to the individual customers. The detailed capital cost estimate is provided as Appendix B.

6. Permitting and Environmental Compliance

6.1 Biological Setting

The Southwest Regional Gap Analysis Project (SWReGAP) maps the Allison area as Colorado Plateau pinyon-juniper woodland, inter-mountain basins greasewood flat, and inter-mountain basins mixed salt desert scrub. These vegetation categories (termed “ecological systems”), together with typical wildlife occurring in McKinley County, are described in Appendix C.

6.2 Special-Status Species

Federally listed endangered and threatened plant and animal species receive protection under the Endangered Species Act (ESA) of 1973. In McKinley County the black-footed ferret (*Mustela nigripes*), the southwestern willow flycatcher (*Empidonax traillii extimus*), the least tern (*Sternula antillarum athalassos*), and the Zuni bluehead sucker (*Catostomus discobolus yarrowi*) are all listed as endangered, and the Mexican spotted owl (*Strix occidentalis lucida*), yellow-billed cuckoo (*Coccyzus americanus*), and Zuni fleabane (*Erigeron rhizomatus*) are listed as threatened.



Some of the above species, along with others, also receive protection under New Mexico's Wildlife Conservation Act [17-2-37 to 17-2-46 NMSA 1978] or at the Navajo Nation level. All of these species, including the bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), Costa's hummingbird (*Calypte costae*), and gray vireo (*Vireo vicinior*) must be considered for planning purposes.

6.3 Permitting and Compliance

Prior to construction of the preferred alternative for Allison, the contractor would be required to address applicable state and federal requirements for construction, including ROW for water lines. Additionally, this project falls within the project area of the NGWSP. Key requirements for that project are included here for reference. The *Record of Decision for the Navajo-Gallup Water Supply Project Planning Report and Final Environmental Impact Statement* (USBR, 2009) indicates steps needed for meeting all environmental compliance regarding final designs. Construction of water lines is expected to create temporary turbidity and other water quality concerns, and USBR is tasked with obtaining required permits under Section 404 of the Clean Water Act (CWA) for impacts associated with jurisdictional waters of the United States. Nationwide permits authorization under Nationwide Permits (NWP) No. 12 (Utility Line Activities) will be requested for temporary construction disturbances to perennial and intermittent stream pipeline crossings. Compliance with General Condition 18, Endangered Species, is required for all NWPs.

The New Mexico Wildlife Conservation Act (WCA) (NMSA 17-2-37) authorizes the New Mexico Department of Game and Fish to create a list of endangered or threatened wildlife within the state, and to take steps to protect and restore populations of species on the list. Actions causing the death of a state listed endangered animal are in violation of the WCA. For all of these reasons, in addition to other federal and state regulations and guidelines, the planning phase for any proposed new water line should include a biological survey with the following objectives:

- Determination of the ordinary high water mark at each stream crossing, in order to determine disturbance acreages for jurisdictional waters



- Wetland delineations, as needed
- Identification of noxious weeds along the route of the proposed water line
- Assessment of habitat for federal and state threatened and endangered species, as well as any additional species listed by the Navajo Nation, as needed

The Migratory Bird Treaty Act makes it unlawful to hunt, take, capture, kill, possess, import, or export any migratory birds, their nests, and eggs. Construction of the new water line should therefore occur outside the nesting season or be preceded by nest surveys to locate and protect any active nest at risk from construction activities.

Archaeological surveys are also needed along the route of the proposed new water line to avoid or mitigate losses of cultural resources that could be affected by the construction and operation of the water line. Native American human remains, funerary objects, or objects of cultural patrimony may also be encountered during the construction of new water lines of the NGWSP. Therefore, prior to issuing any approvals or permits for activities related to the NGWSP, USBR is tasked with not just the implementation of a program to avoid and mitigate the loss of cultural resources, but also full compliance with the relevant sections of the Native American Graves Protection and Repatriation Act (NAGPRA) and 43 CFR 10.3 (USBR, 2009).

References

New Mexico Environment Department (NMED). 2014. Water system details: Allison Water Association. Drinking Water Branch. https://eidea.nmenv.state.nm.us/DWW/JSP/WaterSystemDetail.jsp?tinwsys_is_number=40&tinwsys_st_code=NM&wsnumber=NM3508117 Accessed January 2014.

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U.S. Bureau of Reclamation (USBR). 2009. Planning report and final environmental impact statement, Navajo-Gallup Water Supply Project New Mexico – Arizona. July 2009. Available at <<http://www.usbr.gov/uc/envdocs/eis/navgallup/FEIS/index.html>>.

Appendix A
Alternative Scoring

Alternative Evaluation

Name of System: Allison

Alternative:

No Connection Alternative: Drill
New or Supplemental well with
service from small system

Connection with master meter to
Gallup or NTUA (Water system still
responsible for service)

Connection to Gallup or NTUA,
who provides service to individual
customers (water system no longer
in place)

Goals	Performance Measures/Attributes	Score (0–100)	Criteria Weight	Evaluation Total
Long-term sustainable supply	Renewable water supply	40	4	160
Implementable	Project complexity	35	3	105
	Water right acquisition or transfer	20	4	80
Cost	Projected capital and O&M costs	50	4	200
Local environmental and health and safety benefits	Environmental considerations	50	4	200
	Health, safety, and welfare	60	4	240
	Watershed and regional approach	20	4	80
Community preference	Reliability of service	60	5	300
	Complexity of managerial and operations and maintenance requirements for systems and communities	50	4	200
Total				1565

Alternative Evaluation

Name of System: Allison

Alternative:

No Connection Alternative: Drill
New or Supplemental well with
service from small system

Connection with master meter to
Gallup or NTUA (Water system still
responsible for service)

Connection to Gallup or NTUA,
who provides service to individual
customers (water system no longer
in place)

Goals	Performance Measures/Attributes	Score (0–100)	Criteria Weight	Evaluation Total
Long-term sustainable supply	Renewable water supply	70	4	280
Implementable	Project complexity	60	3	180
	Water right acquisition or transfer	50	4	200
Cost	Projected capital and O&M costs	60	4	240
Local environmental and health and safety benefits	Environmental considerations	60	4	240
	Health, safety, and welfare	70	4	280
	Watershed and regional approach	90	4	360
Community preference	Reliability of service	60	5	300
	Complexity of managerial and operations and maintenance requirements for systems and communities	60	4	240
Total				2320

Alternative Evaluation

Name of System: Allison

Alternative:

No Connection Alternative: Drill New or Supplemental well with service from small system

Connection with master meter to Gallup or NTUA (Water system still responsible for service)

Connection to Gallup or NTUA, who provides service to individual customers (water system no longer in place)

Goals	Performance Measures/Attributes	Score (0–100)	Criteria Weight	Evaluation Total
Long-term sustainable supply	Renewable water supply	70	4	280
Implementable	Project complexity	70	3	210
	Water right acquisition or transfer	95	4	380
Cost	Projected capital and O&M costs	80	4	320
Local environmental and health and safety benefits	Environmental considerations	60	4	240
	Health, safety, and welfare	70	4	280
	Watershed and regional approach	90	4	360
Community preference	Reliability of service	80	5	400
	Complexity of managerial and operations and maintenance requirements for systems and communities	90	4	360
Total				2830

Appendix B

**Preliminary
Cost Estimate for
Preferred Alternative**

Appendix C
Vegetation and Wildlife



Appendix C. Vegetation and Wildlife

C.1 Vegetation

Southwest Regional Gap Analysis Project (SWReGAP) maps the Allison area as Colorado Plateau pinyon-juniper woodland, inter-mountain basins greasewood flat, and inter-mountain basins mixed salt desert scrub. These vegetation categories (termed “ecological systems”) are described in the following subsections.

C.1.1 Colorado Plateau Pinyon-Juniper Woodland

The Colorado Plateau pinyon-juniper woodland ecological system occurs in dry mountains and foothills of the Colorado Plateau region, including the western slope of Colorado to the Wasatch Range, south to the Mogollon Rim, and east into the northwestern corner of New Mexico. It is typically found at lower elevations ranging from 4,900 to 8,000 feet above mean sea level (feet msl). Woodlands of this ecological system occur on warm, dry sites on mountain slopes, mesas, plateaus, and ridges. Severe climatic events occurring during the growing season, such as frosts and drought, are thought to limit the distribution of pinyon-juniper woodlands to relatively narrow altitudinal belts on mountainsides. Soils supporting this system vary in texture, ranging from stony, cobbly, gravelly sandy loams to clay loam or clay.

Twoneedle pinyon (*Pinus edulis*) and/or Utah juniper (*Juniperus osteosperma*) dominate the tree canopy. In the southern portion of the Colorado Plateau in northern Arizona and northwestern New Mexico, oneseed juniper (*Juniperus monosperma*) and hybrids of juniper species (*Juniperus* spp.) may dominate or co-dominate the tree canopy. Rocky Mountain juniper (*Juniperus scopulorum*) may co-dominate or replace Utah juniper at higher elevations. Understory layers are variable and may be dominated by shrubs, graminoids, or be absent. Associated species include greenleaf manzanita (*Arctostaphylos patula*), big sagebrush (*Artemisia tridentata*), littleleaf mountain mahogany (*Cercocarpus intricatus*), alderleaf mountain mahogany (*Cercocarpus montanus*), blackbrush (*Coleogyne ramosissima*), Stansbury cliffrose (*Purshia stansburiana*), antelope bitterbrush (*Purshia tridentata*), Gambel oak (*Quercus gambelii*), blue grama (*Bouteloua gracilis*), James' galleta (*Pleuraphis jamesii*), or muttongrass



(*Poa fendleriana*). The Colorado Plateau pinyon-juniper woodland occurs at higher elevations than the Great Basin pinyon-juniper woodland and Colorado Plateau shrubland systems.

C.1.2 Inter-Mountain Basins Greasewood Flat

This ecological system occurs in intermountain basins throughout much of the western United States and extends onto the western Great Plains. It typically occurs near drainages on stream terraces and flats or may form rings around more sparsely vegetated playas. Sites typically have saline soils and a shallow water table and flood intermittently, but remain dry for most growing seasons. The water table remains high enough to maintain vegetation, despite salt accumulations. This system usually occurs as a mosaic of multiple communities, with open to moderately dense shrublands dominated or co-dominated by greasewood (*Sarcobatus vermiculatus*). Fourwing saltbush (*Atriplex canescens*), shadscale saltbush (*Atriplex confertifolia*), or winterfat (*Krascheninnikovia lanata*) may be present to co-dominant. Occurrences are often surrounded by mixed salt desert scrub. The herbaceous layer, if present, is usually dominated by graminoids. There may be inclusions of alkali sacaton (*Sporobolus airoides*), saltgrass (*Distichlis spicata*) (where water remains ponded the longest), or common spikerush (*Eleocharis palustris*) herbaceous types.

C.1.3 Inter-Mountain Basins Mixed Salt Desert Scrub

This extensive ecological system includes open-canopied shrublands of typically saline desert basins, alluvial slopes, and plains across the Intermountain western United States. This type also extends in limited distribution into the southern Great Plains. Substrates are often saline and calcareous, medium- to fine-textured, alkaline soils, but include some coarser-textured soils. The vegetation is characterized by a typically open to moderately dense shrubland composed of one or more *Atriplex* species such as *Atriplex confertifolia*, *Atriplex canescens*, *Atriplex polycarpa*, or *Atriplex spinifera*. Other shrubs present to co-dominant may include *Artemisia tridentata* ssp. *wyomingensis*, *Chrysothamnus viscidiflorus*, *Ericameria nauseosa*, *Ephedra nevadensis*, *Grayia spinosa*, *Krascheninnikovia lanata*, *Lycium* spp., *Picrothamnus desertorum*, or *Tetradymia* spp. *Sarcobatus vermiculatus* is generally absent, but if present does not co-dominate. The herbaceous layer varies from sparse to moderately dense and is



dominated by perennial graminoids such as *Achnatherum hymenoides*, *Bouteloua gracilis*, *Elymus lanceolatus* ssp. *lanceolatus*, *Pascopyrum smithii*, *Pleuraphis jamesii*, *Pleuraphis rigida*, *Poa secunda*, or *Sporobolus airoides*. Various forbs are also present.

C.2 Wildlife

Mammals occurring in McKinley County and in the Great Basin Conifer Woodland biotic community (Brown and Lowe, 1977; Brown, 1982) typically include small mammals such as squirrels, mice, gophers, rats, rabbits, badgers, raccoon, and skunks, as well as larger mammals such as gray, kit, and red foxes (*Urocyon cinereoargenteus*, *Vulpes macrotis*, *V. vulpes*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), and mule deer (*Odocoileus hemionus*).

Resident and migratory birds expected in the area include western kingbird (*Tyrannus verticalis*), northern mockingbird (*Mimus polyglottos*), broad-tailed and rufous hummingbirds (*Selasphorus platycercus*, *S. rufus*), black-chinned hummingbird (*Archilochus alexandri*), redheaded woodpecker (*Melanerpes erythrocephalus*), northern flicker (*Colaptes auratus*), dark-eyed junco (*Junco hyemalis*), red-breasted, white-breasted, and pygmy nuthatches (*Sitta canadensis*, *S. carolinensis*, *S. pygmaea*), western meadowlark (*Sturnella neglecta*), pinyon jay (*Gymnorhinus cyanocephalus*), common raven (*Corvus corax*), great horned owl (*Bubo virginianus*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), northern harrier (*Circus cyaneus*), turkey vulture (*Cathartes aura*), several species of warblers, vireos, wrens, swallows, and sparrows, and numerous others.

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- Brown, D.E., and C.H. Lowe. 1977. *Biotic communities of the Southwest map*. USDA Forest Service, Ft. Collins, Colorado.