CONJUNCTIVE GROUNDWATER DEVELOPMENT PLAN

Navajo-Gallup Water Supply Project

Prepared by:
Navajo Nation Department of Water Resources
Water Management Branch
March 30, 2010

THE NAVAJO NATION
DEPARTMENT OF WATER RESOURCES

P.O. BOX 678 * FORT DEFIANCE, ARIZONA 86504 * (928)729-4003 * FAX (928)729-4029

JOE SHIRLEY, JR
PRESIDENT

BEN SHELLY
VICE PRESIDENT

March 30, 2010

Rick Ehat,
Navajo San Juan River Settlement Project Manager
Bureau of Reclamation
Upper Colorado Region
Western Colorado Area
835 East 2nd Avenue, Suite 300
Durango, Colorado 81301-5475

SUBJECT: **Transmittal of the Navajo Gallup Water Supply Project Conjunctive Groundwater Plan**

Dear Mr. Ehat,

Pursuant to the Navajo Nation San Juan River Settlement Act, Section 10606 of Public Law 111-11, the Navajo Nation, in consultation with the Secretary, shall complete a conjunctive groundwater development plan for wells and related infrastructure in the San Juan River, Little Colorado and Rio Grande Basins. The Navajo Nation Department of Water Resources, working with U.S. Bureau of Reclamation, the U.S. Bureau of Indian Affairs, the Indian Health Service and the Navajo Tribal Utility Authority, has drafted this plan. The plan is attached to this letter and it describes conceptually the groundwater projects to be considered under this authorization. The plan also includes the formation of a Conjunctive Groundwater Projects Coordinating Committee to assist the Navajo Nation to implement the groundwater projects.

Once again, we appreciate the efforts of you and your staff to assist with this critical work.

Sincerely,

Ray Benally, Director

CONJUNCTIVE GROUNDWATER DEVELOPMENT PLAN
Navajo-Gallup Water Supply Project
March 26, 2010

Introduction

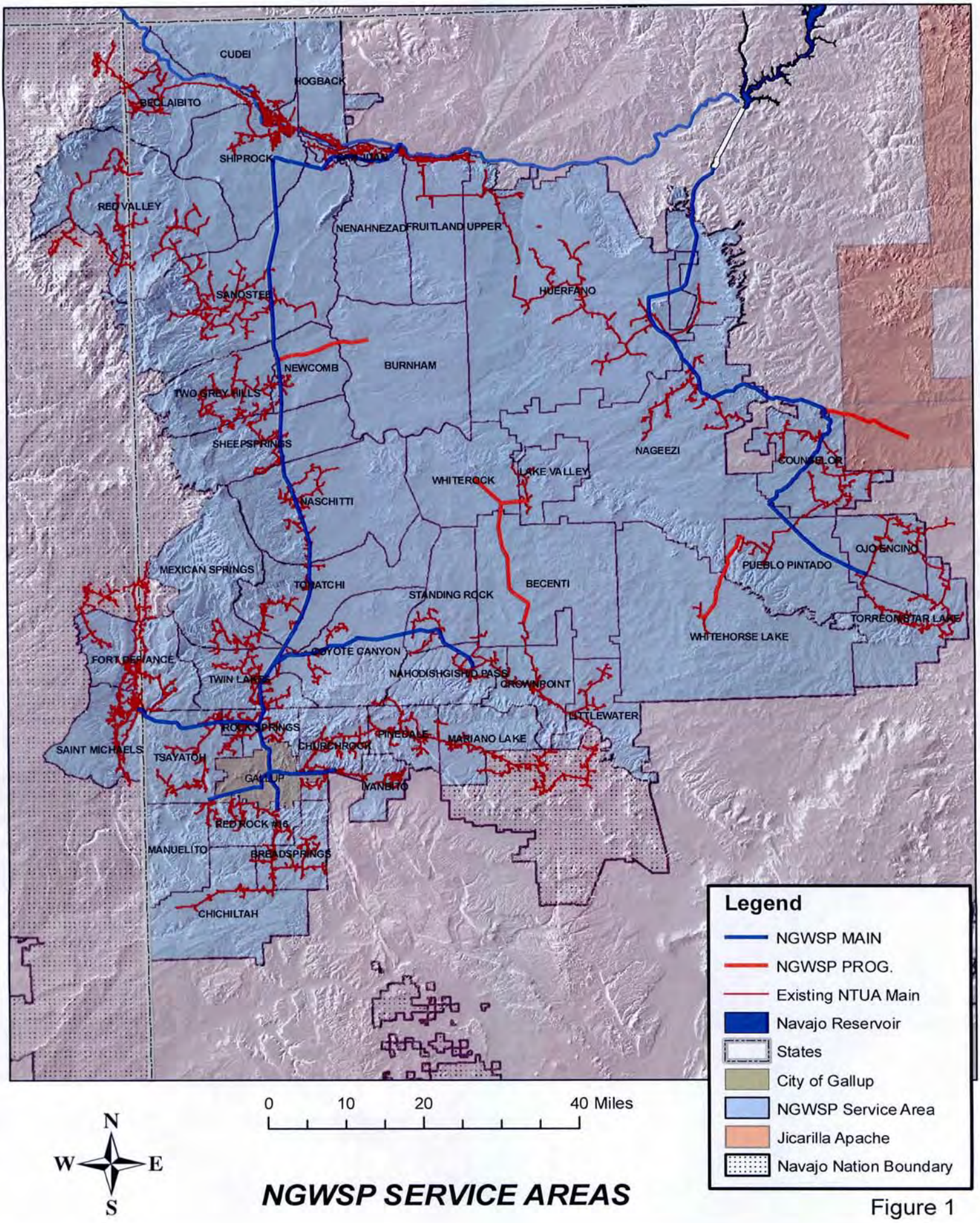
This Conjunctive Groundwater Development Plan (Plan) identifies and prioritizes construction and rehabilitation of wells and related facilities to serve Navajo community water systems in the Navajo Gallup Water Supply Project (Project) service area. The Project includes a conjunctive groundwater component to supplement the San Juan River diversions. The objectives of the Plan are to: 1) describe groundwater supply requirements to meet Navajo community water system needs until Project water deliveries begin; 2) describe groundwater supplies to be used conjunctively with Project supplies to meet long term demands; 3) identify and prioritize construction and rehabilitation of wells and related facilities to meet these requirements; and 4) present a process for selecting and administering conjunctive supply projects for construction as funding becomes available.

Background

The Omnibus Public Land Management Act of 2009 (P.L. 111-11) approved, ratified, and confirmed the San Juan River Basin in New Mexico Navajo Nation Water Rights Settlement Agreement (Navajo Settlement Agreement). Construction of the Project is authorized under P.L. 111-11 to convey a reliable Municipal and Industrial (M&I) water supply to the eastern section of the Navajo Nation, the southwestern part of the Jicarilla Apache Nation, and the City of Gallup via diversions from the San Juan River in northern New Mexico. This Plan is a component of the Navajo Settlement Agreement implementation.

The Project will divert approximately 37,000 acre-feet of water per year from the San Juan River, based on the projected population for 2040, with a demand rate of 160 gallons per capita per day (gpcd). The Cutter Lateral Diversion will divert 4,680 acre-feet per year. The San Juan Lateral at Nenahnezad will divert the remaining 33,000 acre-feet of diversion. Based on the expected populations in the year 2040, the proposed project would serve approximately 249,000 people in 43 chapters in the Navajo Nation, 1,300 people in the Jicarilla Apache Nation, and approximately 47,000 people in the City of Gallup. (Reclamation, 2009. Volume I). The Project service area is shown in Figure 1.

The Project includes a conjunctive groundwater component to supplement the San Juan River diversions to meet 2040 Navajo community M&I demands. Short term refers to the period from the present until the Project surface water deliveries begin in 2024. Long term refers to the period following beyond 2024. Development of the conjunctive groundwater component recognizes the following issues and constraints: 1) existing water supply facilities are inadequate to meet short term demands in some areas; 2) even with the NGWSP, groundwater use is projected to increase in the long term, 3) some areas will rely entirely on groundwater supplies longer than those areas with earlier surface water deliveries, 4) using groundwater reduces the water demands on the San Juan River, and 5) groundwater creates operational advantages during times of surface water shortages, during times of mechanical problems, and during high peak periods.



NGWSP SERVICE AREAS

Figure 1

The indexed funds available (approximately $35 million) are inadequate for the full plan that was described in the *Planning Report/Final Environmental Impact Statement* (PR/FEIS) (Reclamation, 2009. Volume II, Appendix A). There are opportunities to coordinate with the Indian Health Service (IHS), the Navajo Tribal Utility Authority (NTUA) and others to best meet the Plan objectives. A proposed list of conjunctive groundwater projects is presented which reflects the initial attempt address Plan objectives, within the constraints of eligibility under the Plan's authority and funding availability. The Plan must have flexibility to adapt to revised demand projections, on-going assessment of wells and related facilities needed to meet long term demands, and future construction activities undertaken by IHS, NTUA and others.

Authority for Conjunctive Groundwater Management Plan

Public Law 111-11 authorizes the construction or rehabilitation of wells and related pipeline facilities in the San Juan, Little Colorado and Rio Grande Basins (P.L 111-11 at Title X, Subtitle B, Part III, Section 10606; ATTACHMENT A). Section 10606 paragraphs (b) and (c) of the Act authorize construction or rehabilitation of wells and related pipeline facilities for the diversion and distribution of:

1,670 acre-feet in the San Juan River Basin in New Mexico
680 acre-feet in the Little Colorado River Basin in New Mexico
80 acre-feet in the Rio Grande Basin in New Mexico
770 acre-feet on the Little Colorado River Basin in Arizona

Section 10609(b)(1) authorizes to be appropriated $30,000,000 (in 2008 dollars) for the construction or rehabilitation and operation and maintenance of conjunctive use wells in the San Juan Basin for the period of fiscal years 2009 through 2019. Section 10609(b) (2) authorizes to be appropriated "such sums as are necessary" for the Little Colorado and Rio Grande Basins for the period of fiscal years 2009 through 2024. The Navajo Nation, in consultation with the Secretary, is directed to complete the conjunctive groundwater development plan for such construction and rehabilitation.

Summary of M&I Supplies and Demands

Total projected M&I demand for the Project service area is approximately 52,000 acre-feet per year (AFA) by the year 2040 using an average water demand of 160 gallons per capita per day (gpcd). Demands are to be met using a combination of San Juan River diversions and groundwater supplies. The sustainable groundwater supplies for the Navajo public water systems were estimated to total 3,200 AFA. Supplies and demands are summarized in Table 1. Details of the Project supplies and demands can be found in the PR/FEIS (Reclamation, 2009. Volume II, Appendix A).

TABLE 1
NAVAJO-GALLUP DEMANDS FOR YEAR 2040

Service Area	Chapter	Point of Use[1]	1990 Census Pop.	2040 Pop. [2]	2040 Demand [3] (Ac-ft/yr)[4]	2040 G.W. Production +ALP[5] (Ac-ft/yr)	2040 SJR Diversion[6] (Ac-ft/yr)	2040 SJR Depletion [7] (Ac-ft/yr)
City of Gallup, NM	City of Gallup [8]	L.C.	19,154	47,197	8,459	1,439	7,500	7,500
Central Area, NM	Burnham	U.C.	246	837	150	0	150	150
	Lake Valley	U.C.	436	1,484	266	46	220	220
	White Rock	U.C.	201	684	123	0	123	123
	White Horse Lake	U.C.	610	2,076	372	31	341	341
	SUBTOTAL		*1,493*	*5,082*	*911*	*77*	*834*	*834*
Crownpoint, NM	Becenti	U.C.	193	657	118	0	118	118
	Coyote Canyon	U.C.	1,234	4,200	753	61	691	691
	Crownpoint	U.C.	2,658	9,047	1,622	614	1,008	1,008
	Dalton Pass	U.C.	313	1,065	191	0	191	191
	Little Water	U.C.	638	2,172	389	0	389	389
	Standing Rock	U.C.	251	854	153	77	76	76
	SUBTOTAL		*5,287*	*17,996*	*3,225*	*752*	*2,473*	*2,473*
Gallup Area, NM	Bread Springs	L.C.	1,219	4,149	744	77	667	667
	Chichiltah	L.C.	1,555	5,293	949	0	949	949
	Church Rock	L.C.	1,780	6,059	1,086	123	963	963
	Iyanbito	L.C.	974	3,315	594	153	441	441
	Mariano Lake	L.C.	726	2,471	443	92	351	351
	Pinedale	L.C.	609	2,073	372	0	372	372
	Red Rock	L.C.	1,041	3,543	635	61	574	574
	SUBTOTAL		*7,904*	*26,903*	*4,822*	*506*	*4,316*	*4,316*
Huerfano, NM	Huerfano	U.C.	511	1,739	312	31	281	281
	Nageezi	U.C.	981	3,339	598	15	583	583
	SUBTOTAL		*1,492*	*5,078*	*910*	*46*	*864*	*864*
Rock Springs, NM	Manuelito	L.C.	631	2,148	385	46	339	339
	Rock Springs	L.C.	1,685	5,735	1,028	77	951	951
	Tsayatoh	L.C.	1,433	4,878	874	46	828	828
	SUBTOTAL		*3,749*	*12,761*	*2,287*	*169*	*2,118*	*2,118*
Route 491, NM	Mexican Springs	U.C.	711	2,420	434	0	434	434
	Naschitti	U.C.	1,539	5,238	939	77	862	862
	Newcomb	U.C.	651	2,216	397	12	385	385
	Sanostee	U.C.	2,081	7,083	1,270	153	1,116	1,116
	Sheep Springs	U.C.	660	2,246	403	15	387	387
	Tohatchi	U.C.	1,607	5,470	980	307	673	673
	Twin Lakes	U.C.	1,967	6,695	1,200	153	1,047	1,047
	Two Grey Hills	U.C.	883	3,005	539	77	462	462
	SUBTOTAL		*10,099*	*34,374*	*6,161*	*795*	*5,366*	*5,366*
Torreon, NM [11]	Counselor	U.C.	1,365	4,646	833	0	833	833
	Ojo Encino	R.G.	596	2,029	364	15	348	348
	Pueblo Pintado	U.C.	472	1,607	288	0	288	288
	Torreon	R.G.	1,364	4,643	832	61	771	771
	SUBTOTAL		*3,797*	*12,924*	*2,316*	*77*	*2,240*	*2,240*

TABLE 1 (cont'd.)

San Juan River, NM	Beclaibito	U.C.	388	1,321	237	0	237	118
	Cudei	U.C.	495	1,685	302	0	302	151
	Hogback	U.C.	740	2,519	451	0	451	226
	Nenahnezad	U.C.	1,253	4,265	764	0	764	382
	San Juan	U.C.	540	1,838	329	0	329	165
	Shiprock	U.C.	8,100	27,570	4,942	0	4,942	2,471
	Upper Fruitland	U.C.	2,288	7,788	1,396	0	1,396	698
	SUBTOTAL [10]		*13,804*	*46,985*	*8,421*	*4,680*	*3,741*	*1,871*
NAPI Industrial, NM [9]		U.C.	n/a	n/a	7,274	n/a	700	700
NEW MEXICO UPPER BASIN		*U.C.*	*34,012*	*115,768*	*28,024*	*6,350*	*15,100*	*13,229*
NEW MEXICO LOWER BASIN		*L.C.*	*30,807*	*86,861*	*15,568*	*2,114*	*13,934*	*13,934*
RIO GRANDE BASIN		*R.G.*	*1,960*	*6,671*	*1,196*	*77*	*1,119*	*1,119*
TOTAL NEW MEXICO			*66,779*	*209,300*	*44,788*	*8,541*	*30,153*	*28,282*
Window Rock, AZ	Fort Defiance	L.C.	6,187	21,059	3,774	767	3,007	3,007
	Saint Michaels	L.C.	5,580	18,993	3,404	0	3,404	3,404
TOTAL ARIZONA [12]		*L.C.*	*11,767*	*40,052*	*7,179*	*767*	*6,411*	*6,411*
PROJECT TOTAL			**78,546**	**249,352**	**51,966**	**[13] 10,008**	**36,564**	**34,693**

Notes: Rounding error may cause subtotals to be off by 1

1 U.C.=Upper Colorado Basin, L.C.=Lower Colorado Basin, R.G.=Rio Grande Basin

2 Annual growth for the City of Gallup is 1.82%. Growth for Navajo Nation is ----->

3 Per capita water demand is 160 gallons per person per day

4 Acre-feet per year

5 ALP=Animas-LaPlata; estimated sustainable groundwater production estimated by NNDWR

6 Diversions = demand - groundwater use

7 Depletions are based on zero return flow and use of sustainable groundwater

8 The City of Gallup plans to recharge its aquifer and use groundwater for summer seasonal peaking

9 Navajo Agricultural Products Industry depletions are 700 AFY, including 400 AFY for the proposed french fry factory (from March 16, 2001, NNDWR technical memorandum).

10 Approximately 4,680 AFY of diversion and 2,340 AFY of depletion from the San Juan River subarea's demand is met by the ALP Project, and 1,871 acre-feet of depletion is met by the Navajo-Gallup Water Supply Project. Assumes 50 percent of the San Juan River municipal diversions return to the river.

11 Torreon includes use in the Rio Grande Basin. These depletions are counted toward New Mexico Upper Colorado River allocation.

12 Window Rock subarea includes depletions, which are counted toward the Upper and/or Lower Colorado allocation.

13 Water not supplied by the Navajo-Gallup Water Supply Project.

Source: Reclamation, 2009. PR/FEIS Volume II, Table II-3

2040 total groundwater production: City of Gallup 1,439 ac-ft/y
Navajo Service Areas 3,189 ac-ft/y

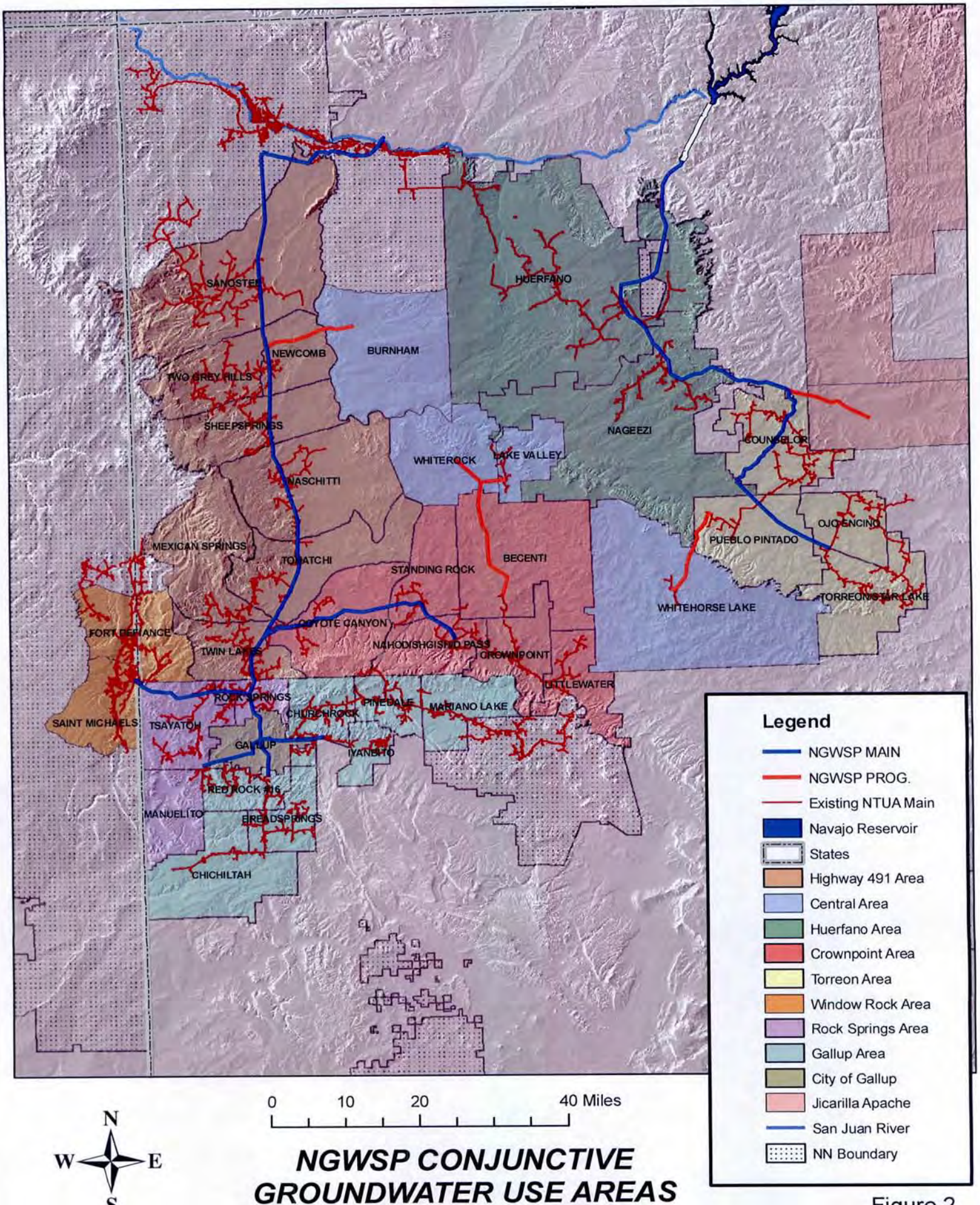
Conjunctive Groundwater Supply for Navajo Communities – NGWSP PR/FEIS Preferred Alternative

To characterize the ground water supply for the Navajo communities served by the Project, communities in the service area were grouped into eight municipal sub-areas. A municipal subarea is an area with common water sources and common public water systems. The sub-areas include: 1) Central Project, 2) Crownpoint, 3) Huerfano, 4) Navajo lands adjacent to the City of Gallup, 5) Rock Springs, 6) Route 491 corridor, 7) Torreon and 8) Window Rock (Figure 2). The estimated sustainable ground water supply components are presented in the *Final Draft Technical Memorandum, Navajo-Gallup Water Supply Project* (Navajo Nation Department of Water Resources et al, 2001) and are summarized in Table 2. The total conjunctive groundwater production proposed for the eight municipal subareas is approximately 3,200 AFA, which is 200 AFA more than current ground water production.

TABLE 2
PROPOSED MUNICIPAL CONJUNCTIVE GROUNDWATER DEVELOPMENT

MUNICIPAL SUBAREA	PROPOSED 2040 G.W. PRODUCTION (Acre-feet)	PROPOSED CONJUNCTIVE GROUNDWATER COMPONENT
1. Central	77	Burnham: 1 well at 4,000 feet in the Gallup, Dakota or Morrison at 120 gpm Lake Valley: 2 wells at 100 feet the Chaco River Alluvium at 20 gprn White Rock: 1 well at 4.000 feet in the Morrison at 100 gpm Whitehorse Lake: 2 wells at 500 feet in the Menefee Formation at 20 gpm
2. Crownpoint	752	Coyote Canyon: 2 wells at 1,500 feet in the Dalton Sandstone at 60 gpm Crownpoint: 3 wells at 2,000 feet in the Westwater Sandstone at 100 gpm Dalton Pass: 2 wells at 2,000 feet in Gallup Sandstone at 20 gprn Standing Rock: 2 wells at 2,500 feet in the Westwater at 80 gpm
3. Huerfano	46	2 wells at 1,000 feet in the Ojo Alamo Sandstone at 60 gpm
4. Gallup Area	502	Breadsprings: 2 well at 2,000 feet in the Gallup Sandstone at 50 gpm Church Rock: 2 well at 2,000 feet in the Chinle at 30 gpm Iyanbito: 2 well at 2,000 feet in the Glorietta at 125 gpm Red Rock: 2 well at 2,000 feet in the Gallup Sandstone at 50 gpm
5. Rock Springs	169	3 wells at 1.700 feet in the Gallup Sandstone at 40 gpm
6. Route 491	795	Naschitti: 2 wells at 1,500 feet in the Point Lookout Sandstone at 80 gpm Tohatchi: 3 wells at 1,500 feet in the Point Lookout Sandstone at 150 gpm
7. Torreon	77	6 wells at 1,500 feet in the Menefeeffoint Lookout Sandstone at 20 gpm
8. Window Rock	767	6 wells at 750 feet in the Gallup/Dakota/Morrison at 60 gpm 6 wells at 300 feet in the C-Aquifer at 50 gprn and conveyance system
Total	**3,185**	

Source: Navajo Nation Department of Water Resources, City of Gallup, Northwest New Mexico Council of Governments, Bureau of Reclamation. March 16, 2001. Final Draft Technical Memorandum, Navajo-Gallup Water Supply Project.



NGWSP CONJUNCTIVE GROUNDWATER USE AREAS

Figure 2

Conjunctive Groundwater Development Projects

The Navajo Nation Department of Water Resources (NNDWR) developed the *Conjunctive Groundwater Development Plan* (Plan) in consultation with NTUA, IHS, Bureau of Indian Affairs, and Reclamation. Due to uncertainties in pipeline construction phasing and completion, uncertainties in demand projections, availability of funds and other factors, the plan must be adaptable. The following conjunctive groundwater development projects have been proposed to meet short and long term demands for the Navajo communities.

To meet 2020 groundwater demands in the service area: 1) NNDWR Water Management Branch (WMB) assessed the 2005 NTUA production data and identified systems requiring additional wells to meet 2020 demands (Attachment B); 2) NTUA provided its Capital Improvement Plan for years 2010-2014 (Attachment C); 3) IHS provided a list of Conjunctive Use Buildout Projects (Attachment D).

To meet the long term conjunctive groundwater demands, an assessment of wells and pipeline facilities requiring rehabilitation or replacement to meet the long term requirements is needed. Factors to be considered may include: revised demands, condition of wells, rehabilitation/replacement of wells and distribution lines. The Navajo Nation will utilize surface water within the regional systems as its principal source of water supply. Groundwater from the conjunctive use wells will supplement surface water supplies with an additional 10% of long term supply. Groundwater will be utilized for: seasonal peaking, during times when the pipeline is not able to operate at its design capacity, during droughts when surface water supplies in the San Juan River basin are reduced, and when water supplies are reduced during shortages caused by provisions of law or other regulations.

Implementation

The NNDWR-WMB will be the fiscal agent for administering the Plan under a P.L. 638 (Subpart J) construction contract. Recognizing BIA's trust responsibility, NNDWR assumes that the BIA will have sufficient resources for oversight and Navajo Nation administrative overhead costs, which will not be charged against groundwater project appropriations. Based on preliminary estimates from BIA, annual funding requests of $2 million to $5 million will be submitted for fiscal years 2012 to 2019. A Conjunctive Groundwater Project Coordination Committee (CGPCC) to assist NNDWR will be comprised of technical representatives from NNDWR, NTUA, IHS, BIA and Reclamation. The CGPCC will:

1. Develop a prioritized project list (well construction/rehabilitation, pipeline facilities construction/rehabilitation).
2. Annually select projects for the following fiscal year.
3. Annually update the project list.
4. Periodically revise demands.
5. Revise the Conjunctive Groundwater Management Plan as needed.

The CGPCC will meet quarterly or as needed, and annually to identify construction projects for the following two to three year period. An annual review will also afford an opportunity to discuss longer term planning priorities. A charter governing the responsibilities of the CGPCC is attached (Attachment E).

Initial Project List

A list of potential conjunctive ground water projects has been compiled in Table 3. This table includes the location, brief project description and a conceptual level total project cost estimate. The projects that are described are intended to be fully functional and able to generate short term water supply benefits upon completion. The projects typically include some of the NTUA capital improvement needs in the project area in order to ensure that NTUA will be able to treat and convey conjunctive ground water in the short-term, and in most cases NGWSP surface water in the longer term.

The conceptual level cost estimates have been compiled from several different sources that were developed at different levels of engineering design. These cost estimates are for the total project costs and include the direct and indirect costs for project implementation. These costs are intended to be used for planning purposes only. In this case they were used to develop an aggregate package that meets the funding or water supply authorization, whichever is less.

All of the projects listed meet the authorization and the established criteria. However, Table 3 does not include an explicit ranking of the projects selected. The NNDWR concluded that the level of analysis was inadequate to firmly establish this ranking. It is assumed that the first task of the CGPCC will be to use the initial appropriations to improve the costs estimates for all of these proposed projects and to better establish the program ranking.

Once projects have been prioritized and funding becomes available, the following tasks are required:

1. Complete ranking of proposed projects.
2. Complete geohydrologic investigations and preliminary engineering designs.
3. Prepare cost estimates.
4. Complete environmental, ROW and archaeological clearances.
5. Manage construction
6. Pay for interim operation and maintenance of facilities
7. Develop conveyance agreements and convey facilities to NTUA.

Table 3
Initial Conjunctive Groundwater Project List

Priorty	Project Location	Description	Cost	Basin	Ref
	TWIN LAKES	Install 1 new well with casing/ pump/ prefab building/arch clearance and permits	$1,500,000	SAN JUAN	1,2,3
	BURNHAM	Install 2 new wells with casing/ pump/ prefab building/arch clearance and permits	$350,000	SAN JUAN	3
	LAKE VALLEY	Install 3 new wells with casing/ pump/ prefab building/arch clearance and permits	$354,000	SAN JUAN	3
	WHITE ROCK	Install 2 new wells with casing/ pump/ prefab building/arch clearance and permits	$236,000	SAN JUAN	3
	WHITEHORSE LAKE	Install 9 new wells with casing/ pump/ prefab building/arch clearance and permits	$2,025,000	SAN JUAN	3
	COYOTE CANYON	Install 8 new wells with casing/ pump/ prefab building/arch clearance and permits	$9,120,000	SAN JUAN	3
	CROWNPOINT	Install 3 new wells with casing/ pump/ prefab building/arch clearance and permits	$3,180,000	SAN JUAN	2,3
	NAGEEZI	Install 3 new wells with casing/ pump/ prefab building/arch clearance and permits	$1,455,000	SAN JUAN	3
	MEXICAN SPRINGS	Install 1 new well with casing/ pump/ prefab building/arch clearance and permits	$415,000	SAN JUAN	3
	NASCHITTI	Install 8 new wells with casing/ pump/ prefab building/arch clearance and permits	$6,240,000	SAN JUAN	3
	NEWCOMB	Install 3 new wells with casing/ pump/ prefab building/arch clearance and permits	$1,875,000	SAN JUAN	3
	SANOSTEE	Install 5 new wells with casing/ pump/ prefab building/arch clearance and permits	$4,300,000	SAN JUAN	1,3
	SHEEPSPRINGS	Install 1 new well with casing/ pump/ prefab building/arch clearance and permits	$590,000	SAN JUAN	3
	TOHATCHI	Install 1 new well with casing/ pump/ prefab building/arch clearance and permits	$860,000	SAN JUAN	3
	TWO GREY HILLS	Install 1 new well with casing/ pump/ prefab building/arch clearance and permits	$485,000	SAN JUAN	3
	COUNSELOR	Install 3 new wells with casing/ pump/ prefab building/arch clearance and permits	$1,455,000	SAN JUAN	3
	PUEBLO PINTADO	Install 5 new wells with casing/ pump/ prefab building/arch clearance and permits	$1,375,000	SAN JUAN	3
	Naschitti	Sheepsprings/Naschitti Intertie	$4,200,000	SAN JUAN	2
	Littlewater	Install new well with casing/ pump/ prefab building/arch clearance and permits	$590,000	SAN JUAN	2
	Standing Rock/ Nahodish	Intertie 2 miles 10" PVC	$500,000	SAN JUAN	2
	Coyote Canyon/ Standing Rock	3.5 miles 10" PVC	$875,000	SAN JUAN	2
	Sheepsprings/ Naschitti	2 miles 10" PVC	$500,000	SAN JUAN	2
	MANUELITO	Install 2 new wells with casing/ pump/ prefab building/arch clearance and permits	$1,720,000	LITTLE COLORADO-NM	3

Table 3 (cont'd.)

	BREAD SPRINGS	Install 5 new wells with casing/ pump/ prefab building/arch clearance and permits	$4,500,000	LITTLE COLORADO-NM	3
	CHURCH ROCK	Install 14 new wells with casing/ pump/ prefab building/arch clearance and permits	$1,848,000	LITTLE COLORADO-NM	1,3
	IYANBITO	Install 2 new wells with casing/ pump/ prefab building/arch clearance and permits	$1,250,000	LITTLE COLORADO-NM	1,3
	MARIANO LAKE	Install 2 new wells with casing/ pump/ prefab building/arch clearance and permits	$1,560,000	LITTLE COLORADO-NM	3
	RED ROCK	Install 1 new well with casing/ pump/ prefab building/arch clearance and permits	$740,000	LITTLE COLORADO-NM	1,3
	ROCK SPRINGS	Install 4 new wells with casing/ pump/ prefab building/arch clearance and permits	$3,440,000	LITTLE COLORADO-NM	3
	TSAYATOH	Install 4 new wells with casing/ pump/ prefab building/arch clearance and permits	$2,360,000	LITTLE COLORADO-NM	3
	Tsayatoh/ North Manuelito	Intertie 2 miles 10" PVC	$500,000	LITTLE COLORADO-NM	2
	Mariano Lake to Churchrock	12 miles 10" PVC	$3,000,000	LITTLE COLORADO-NM	2
	Churchrock/Iyanbito	Intertie 2 miles 10" PVC	$500,000	LITTLE COLORADO-NM	2
	Iyanbito/Thoreau	Intertie 9 miles 10" PVC	$2,250,000	LCR-NM,RG	2
	Thoreau	Install new well with casing/ pump/ prefab building/arch clearance and permits	$590,000	RIO GRANDE	2
	Haystack/Baca	Intertie 6 miles 10 PVC	$1,500,000	RIO GRANDE	2
	OJO ENCINO	Install 3 new wells with casing/ pump/ prefab building/arch clearance and permits	$1,560,000	RIO GRANDE	3
	Casamero lake	Install new well with casing/ pump/ prefab building/arch clearance and permits	$628,031	RIO GRANDE	1,2
	FORT DEFIANCE	Install 2 new wells with casing/ pump/ prefab building/arch clearance and permits	$1,720,000	LITTLE COLORADO AZ	3
	SAINT MICHAELS	Install 19 new wells with casing/ pump/ prefab building/arch clearance and permits	$7,885,000	LITTLE COLORADO AZ	3

Subtotal San Juan	$42,480,000
Subtotal LCR-NM	$23,668,000
Subtotal Rio Grande	$4,278,031
Subtotal LCR-AZ	$9,605,000
TOTAL	**$80,031,031**

References:

1 NTUA Capital Improvement Plan: Years 2010-2014 (HQ-Well Ops)

2 IHS Conjunctive Use Buildout Projects (03/01/10) (Cost est. DWR-WMB)

3 NNDWR-WMB Analysis of GW Supply Alternatives (03/29/10)

References:

Bureau of Reclamation (Reclamation). 2009. *Planning Report and Final Environmental Impact Statement Nanajo-Gallup Water Supply Project New Mexico – Arizona.*. Prepared by the U.S. Department of the Interior, Bureau of Reclamation, Upper Colorado Region, Salt Lake City, Utah. July 2009.

John, Jason. 2010. *Draft Technical Memorandum: Analysis of Groundwater Supply and Water Well Operation Alternatives for the Navajo-Gallup Water Supply Project Conjunctive Groundwater Service Area.* Water Management Branch, Navajo Nation Department of Water Resources, March 29, 2010.

Levings, Gary W., Kernodle, John Michael and Thorn, Conde' R. 1996. *Summary of the San Juan Structural Basin Regional Aquifer-System Analysis, New Mexico, Colorado, Arizona, and Utah (Water Resources Investigations Report 95-4188).* Regional Aquifer-System Analysis. U.S. Geological Survey. 1996.

Navajo Nation Department of Water Resources, City of Gallup, Northwest New Mexico Council of Governments, Bureau of Reclamation. *Final Draft Technical Memorandum, Navajo-Gallup Water Supply Project.* March 16, 2001.

Navajo Tribal Utility Authority (NTUA), 2008. Well Production Data for 2005. Digital File provided to Water Management Branch by NTUA. 2008.

ATTACHMENT A

PUBLIC LAW 111–11—MAR. 30, 2009 123 STAT. 991
Public Law 111–11
111th Congress
An Act
To designate certain land as components of the National Wilderness Preservation System, to authorize certain programs and activities in the Department of the Interior and the Department of Agriculture, and for other purposes.
Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,
SECTION 1. SHORT TITLE; TABLE OF CONTENTS.
(a) SHORT TITLE.—This Act may be cited as the ''Omnibus Public Land Management Act of 2009''.

SEC. 10606. AUTHORIZATION OF CONJUNCTIVE USE WELLS.

(a) CONJUNCTIVE GROUNDWATER DEVELOPMENT PLAN.—Not later than 1 year after the date of enactment of this Act, the Nation, in consultation with the Secretary, shall complete a conjunctive groundwater development plan for the wells described in subsections (b) and (c).

(b) WELLS IN THE SAN JUAN RIVER BASIN.—In accordance with the conjunctive groundwater development plan, the Secretary may construct or rehabilitate wells and related pipeline facilities to provide capacity for the diversion and distribution of not more than 1,670 acre-feet of groundwater in the San Juan River Basin in the State of New Mexico for municipal and domestic uses.

(c) WELLS IN THE LITTLE COLORADO AND RIO GRANDE BASINS.—

(1) IN GENERAL.—In accordance with the Project and conjunctive groundwater development plan for the Nation, the Secretary may construct or rehabilitate wells and related pipeline facilities to provide capacity for the diversion and distribution of—

(A) not more than 680 acre-feet of groundwater in the Little Colorado River Basin in the State of New Mexico;
(B) not more than 80 acre-feet of groundwater in the Rio Grande Basin in the State of New Mexico; and
(C) not more than 770 acre-feet of groundwater in the Little Colorado River Basin in the State of Arizona.

(2) USE.—Groundwater diverted and distributed under paragraph (1) shall be used for municipal and domestic uses.

(d) ACQUISITION OF LAND.—

(1) IN GENERAL.—Except as provided in paragraph (2), the Secretary may acquire any land or interest in land that is necessary for the construction, operation, and maintenance of the wells and related pipeline facilities authorized under subsections (b) and (c).

(2) LIMITATION.—Nothing in this subsection authorizes the Secretary to condemn water rights for the purposes described in paragraph (1).

(e) CONDITION.—The Secretary shall not commence any construction activity relating to the wells described in subsections (b) and (c) until the Secretary executes the Agreement.

(f) CONVEYANCE OF WELLS.—

(1) IN GENERAL.—On the determination of the Secretary

that the wells and related facilities are substantially complete and delivery of water generated by the wells can be made to the Nation, an agreement with the Nation shall be entered into, to convey to the Nation title to—

(A) any well or related pipeline facility constructed or rehabilitated under subsections (a) and (b) after the wells and related facilities have been completed; and

(B) any land or interest in land acquired by the United States for the construction, operation, and maintenance of the well or related pipeline facility.

(2) OPERATION, MAINTENANCE, AND REPLACEMENT.—

(A) IN GENERAL.—The Secretary is authorized to pay operation and maintenance costs for the wells and related pipeline facilities authorized under this subsection until title to the facilities is conveyed to the Nation.

(B) SUBSEQUENT ASSUMPTION BY NATION.—On completion of a conveyance of title under paragraph (1), the Nation shall assume all responsibility for the operation and maintenance of the well or related pipeline facility conveyed.

(3) EFFECT OF CONVEYANCE.—The conveyance of title to the Nation of the conjunctive use wells under paragraph (1) shall not affect the application of the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.).

(g) USE OF PROJECT FACILITIES.—The capacities of the treatment facilities, main pipelines, and lateral pipelines of the Project authorized by section 10602(b) may be used to treat and convey groundwater to Nation communities if the Nation provides for payment of the operation, maintenance, and replacement costs associated with the use of the facilities or pipelines.

(h) LIMITATIONS.—The diversion and use of groundwater by wells constructed or rehabilitated under this section shall be made in a manner consistent with applicable Federal and State law.

SEC. 10609. AUTHORIZATION OF APPROPRIATIONS.

(b) APPROPRIATIONS FOR CONJUNCTIVE USE WELLS.—

(1) SAN JUAN WELLS.—There is authorized to be appropriated to the Secretary for the construction or rehabilitation and operation and maintenance of conjunctive use wells under section 10606(b) $30,000,000, as adjusted under paragraph (3), for the period of fiscal years 2009 through 2019.

(2) WELLS IN THE LITTLE COLORADO AND RIO GRANDE BASINS.—There are authorized to be appropriated to the Secretary for the construction or rehabilitation and operation and maintenance of conjunctive use wells under section 10606(c) such sums as are necessary for the period of fiscal years 2009 through 2024.

(3) ADJUSTMENTS.—The amount under paragraph (1) shall be adjusted by such amounts as may be required by reason of changes since 2008 in construction costs, as indicated by engineering cost indices applicable to the types of construction or rehabilitation involved.

(4) NONREIMBURSABLE EXPENDITURES.—Amounts made available under paragraphs (1) and (2) shall be nonreimbursable to the United States.

(5) USE.—In addition to the uses authorized under paragraphs (1) and (2), amounts made available under that paragraph may be used for the conduct of related activities to comply with Federal environmental laws.

(6) LIMITATION.—Appropriations authorized under paragraph (1) shall not be used for operation or maintenance of any conjunctive use wells at a time in excess of 3 years after the well is declared substantially complete.

Attachment B
Draft Technical Memorandum
Analysis of Groundwater Supply and Water Well Operation Alternatives for the
Navajo-Gallup Water Supply Project Conjunctive Groundwater Service Area
March 29, 2010

1.0 Introduction

The Navajo-Gallup Water Supply Project (NGWSP) includes a surface water component and a conjunctive groundwater component. The surface water component has two major pipelines that will divert San Juan River surface water from the Cutter Reservoir and the San Juan River. The purpose of this technical memorandum is to describe various ground water development scenarios that will meet some municipal water development needs of the NGWSP service area based on various well operations and funding availability. While the NGWSP surface water component will serve the Navajo Nation, Jicarilla Apache Nation, and the City of Gallup, the conjunctive groundwater component is designed to serve the needs of some Navajo Nation communities. The conjunctive groundwater component will be funded through the US Department of Interior Bureau of Indian Affairs. Navajo Nation representatives will develop the plan for the conjunctive groundwater component. This technical memorandum desribes two water development and operation alternatives that are consistent with available funding through the Settlement Act and Navajo Tribal Utility Authority (NTUA) operations.

2.0 Groundwater Use

Current Navajo Nation groundwater use in the NGWSP service area can be broadly divided into domestic, municipal, industrial and livestock uses. The Navajo Water Management Branch (Branch) has a water well database that includes records of most wells drilled on the Navajo Nation including the NTUA water production wells. NTUA operates a majority of the wells that supply the municipal systems that serve the Navajo Nation in the NGWSP service area. Up until 2005, the Branch worked in cooperation with NTUA to obtain information on NTUA's groundwater production. In recent years NTUA's conversion of their data management system has delayed the transfer of water well production information to the Branch. Table 1 lists the year 2005 NTUA ground water wells within the NGWSP service area. The only other small public water systems in the NGWSP service that serve entities on the Navajo Nation area are operated by the Bureau of Indian Affairs (BIA) and Navajo Department of Water Resources (NDWR).

3.0 Groundwater Production

In 2005, up to 76 NTUA groundwater wells in production within the NGWSP service area (Table 1). The combined groundwater production from those water wells was approximately 2,980 acre-feet in 2005. Table 1 also shows the average production rate in gallons per minute and

average submersible pump time of operation in hours per day for each well. Note that most of the water well produces, on average, less than 100 gallons per minute in the NGWSP service area. The blank rows in Table 1 are place holders for information contained in later tables.

4.0 Available Production from Existing Wells

NTUA prefers to operate their well pumps for less than 12 hours per day. This limit allows NTUA to use other wells on the same public water system if one or more other wells fail. Due to lack of funding and lack of available water in some areas some existing wells run for more than 12 hours per day. Table 1 lists the average number of hours of operation per day for each well. This technical memorandum determines how much more production may be currently available from those wells that pump for less than 12 hours per day, and how much water may be currently needed in some areas where well pumps are running more than 12 hours per day. Table 1 lists the annual production amount in acre-feet per year that is either available (positive number) or overproduced (negative number) for each well based on the average number of hours of operation and the average production rate in year 2005. Equation 1 below depicts the methodology to determine the remaining available production for each well.

> Equation 1: Remaining Available Production = (12 hours per day – hours of production per day for each well) x (average production rate in gallons per minute x 1 acre-foot/325,861 gallons x 60 minute/hour x 24 hours/day x 365 days/year)

The conjunctive groundwater component in the NGWSP planning documents is summarized by chapter, Table 1 also summarizes the available production by Navajo Nation chapter.

5.0 Existing and Proposed Source Aquifers and Well Depths

Table 2 lists the primary source aquifer and total depth for each NTUA production well. The blank rows are place holders for information contained in later tables. Table 2 also contains a grouping of the wells by NGWSP conjunctive groundwater service subareas as it was originally described in the 1999 Navajo-Gallup Water Supply Project Technical Memorandum (NNWMB 1999). The representative chapters for those wells are also represented in Table 2. Chapters that were described as having a conjunctive groundwater component in the NGWSP but don't have an existing NTUA production well were added at this time to the Table 2. Those chapters included Burnham, Whiterock, Becenti, Chichiltah, Pinedale, Manuelito, Pueblo Pintado and Torreon. These chapters may have NTUA water delivered to some of their residents but the source wells located in a different chapter.

Table 2 identified the most likely aquifer and well depth for additional groundwater development for each chapter that was identified as having a conjunctive groundwater component based on the current aquifer source and well depths for existing wells.

6.0 Estimated Well Production Rate and Unit Cost for Proposed Wells

Table 3 presents the average rate of production for the proposed wells based on the aquifers identified in Table 2. Table 3 also estimates the annual yield for each well based on estimated production rate and submersible water well pump run time of either 12 hours per day or 18 hours per day. Typical operations by NTUA prefer not to have pumps running for more than 12 hours per day for maintenance and redundancy purposes. The proposed pumping time of 18 hours per day would only apply for water systems that have more than two wells in operation with the first two wells running their pumps at 12 hours per day and any additional wells running their pumps for up to 18 hours per day.

The proposed direct and indirect aggregate unit costs of drilling, casing, testing and pump installation is shown in Table 4. These unit costs are based on well depth and applied to the proposed wells in Table 3. In addition, an overall direct and indirect cost for appurtenances to deliver the water is also included. The appurtenances are not associated with the depth of the well. It is assumed that 3-phase power may be extended at a reasonable cost.

Table 4: Proposed Unit Costs for Groundwater Wells

Well Depth (feet)	Unit Cost Per Foot	Appurtenances [1]
25 - 200	$200	$100,000
201 - 500	$250	$100,000
501 - 1500	$350	$100,000
1501 - 3000	$400	$100,000

1. Appurtenances includes materials and labor for well house, minimal water line, and minimal power extension for one well.

7.0 Alternatives

The Settlement Act authorizes up to $30 million in 2009 dollars for groundwater development in the San Juan River Basin capable of delivering up to 1,670 acre-feet per year. In addition, there is authorization to appropriate funds for groundwater development for Little Colorado Basin of New Mexico capable of conveying up to 680 acre-feet per year, for the LCR Arizona capable of conveying up to 770 acre-feet per year, and for the Rio Grande Basin capable of conveying up to 80 acre-feet per year. Only the San Juan basin funds are required to be provided as a stipulation of the Settlement Act. The operational alternatives, estimated per capita water use, and projected water demand will need to be practical and fit within the funding constraints. The groundwater wells in the San Juan River basin are to be completed by 2018. Well development in the other basins would be completed by 2024. Depending on the amount of available funding, operational constraints and the projected needs of the conjunctive groundwater development chapters. There are several alternatives that can be explored to meet the projected water needs.

The NGWSP projected 2040 water demand is based on a municipal per capita water use of 160 gallons per capita per day. Since the anticipated completion dates for the water wells are between 2018 and 2024, it is proposed that the 2020 water demand be met by this conjunctive groundwater development plan alternative. The Navajo Area Indian Health Service designs public water system that anticipates a domestic use of 50 gallons per capita per day. Between now and year 2040, the per capita water use in the service areas will increase due to economic development and increase standard of living. For this plan, a per capita water use of 80 gallons per capita per day was proposed as the anticipated per capita water use that would be met by the conjunctive groundwater development plan.

The number of wells needed to meet a 2020 demand of 80 gallons per capita per day for the conjunctive use chapters depends on the anticipated well yields and daily pumping duration. Due to the limited amount of funding, two alternative pumping scenarios were developed for this alternative. Alternative 1 was to limit the pumping time for the well pumps to 12 hours per day for all wells to meet a 2020 water demand with a per capita water use rate of 80 gallons per capita per day. Alternative 2 limits the first two wells for each chapter to 12 hours per day, but third and subsequent wells could run their well pumps up to 18 hours per day to meet a 2020 water demand with a per capita water use rate of 80 gallons per capita per day. The second alternative allows for increased production which will reduce the number of new wells and incorporates some limited redundancy if need to maintenance purposes.

Table 5 shows the estimated cost of Alternative 1. Table 6 summarizes the production and costs by basin and by state.

Table 6: Summary of Alternative 1 Water Development and Estimated Cost

Basin	PL 111-11 Water Budget (acre-feet per year)	PL 111-11 Authorized Amount	Proposed Development (acre-feet per year)	Total Project Cost
SAN JUAN-NM	1670	$30 million	2023	$35,815,000
LITTLE COLORADO RIVER-NM	680		1706	$19,138,000
LITTLE COLORADO RIVER-AZ	770		884	$7,885,000
RIO GRANDE-NM	80	n/a	208	$1,560,000
TOTAL	3200	$30 million	4821	$64,398,000

Note: Assumes all wells pumping at a maximum of 12 hours per day meeting a projected 2020 water demand at 80 gallons per capita per day.

Table 7 shows the estimated cost of Alternative 2. Table 8 summarizes the production and costs by basin and by state.

Table 8: Summary of Alternative 2 Water Development and Estimated Cost

Basin	PL 111-11 Water Budget (acre-feet per year)	PL 111-11 Authorized Amount	Proposed Development (acre-feet per year)	Total Project Cost
SAN JUAN-NM	1670	$30 million	2023	$26,477,000
LITTLE COLORADO RIVER-NM	680		1706	$15,715,000
LITTLE COLORADO RIVER-AZ	770		884	$5,395,000
RIO GRANDE-NM	80	n/a	208	$1,560,000
TOTAL	3200	$30 million	4821	$49,147,000

Note: Assumes first two wells pumping at a maximum of 12 hours per day and additional well pumping at a maximum of 18 hours per day meeting a projected 2020 water demand at 80 gallons per capita per day.

Table 1: Year 2005 Navajo Tribal Utility Authority Water Well Production in Navajo-Gallup Project Service Area

	NTUA WELL NAME	TRIBAL WELL NUMBER	2005 NTUA GROUND WATER PRODUCTION	PRODUCTION RATE IN GALLONS PER MINUTE FROM 2005 NTUA PRODUCTION DATA	AVERAGE PUMP RUN TIME IN HOURS PER DAY FROM 2005 NTUA PRODUCTION DATA (during summer)	REMAINING ANNUAL ACRE-FEET YIELD BASED ON 12 HOUR PER DAY RUN TIME LIMIT PER WELL	TOTAL REMAINING ANNUAL ACRE-FEET YIELD BASED ON 12 HOUR PER DAY RUN TIME LIMIT PER CHAPTER
1							0
2	LAKE VALLEY 1	15T-565	10.89	27	8.6	6.2	
3	LAKE VALLEY 2	15T-565A	11.11	28	7.9	7.7	14
4							0
5	WHITEHORSE LAK	15T-500	5.90	14	6.6	5.1	5
6							0
7	COYOTE CYN 1-B	14T-55	18.47	24	12.0	0.0	
8	COYOTE CYN 1	14T-555	18.67	24	12.5	-0.8	-1
9	CROWNPOINT 1	15-0579	48.98	100	9.6	16.1	
10	CROWNPOINT 2	15-0581	186.73	230	12.5	-7.7	8
11	DZILTHNAODIT 1	19T-529	54.74	129	6.7	46.0	46
12	LITTLE WATER	15T-567	78.23	194	9.7	30.0	30
13	STANDING ROCK	15-0586	33.03	98	5.5	42.8	43
14	BREAD SPRINGS	16T-598	51.60	176	7.2	56.8	57
15							0
16	CHURCHROCK A	16T-538A	0.00				
17	CHURCHROCK B	16T-538B	27.76	24	15.3	-5.3	
18	CHURCHROCK E	16T-538E	12.28	*26*	??	??	
19	CHURCHROCK UNC	16T-538UNC	22.47	22	12.4	-0.6	-6
20	IYANBITO 2	16-0666	0.00	0	0.0	0.0	
21	IYANBITO 1	16-0668	48.96	74	11.1	4.5	4
22	MARIANO LAKE 1	16T-595	72.05	59	19.8	-30.9	
23	MARIANO LAKE 2	16T-596	60.22	116	7.3	36.6	6
24							0
25	RED ROCK	16T-609	93.47	137	10.2	16.6	17
26	KEYAH 1	19T-521	21.92	72	2.5	46.0	
27	CARSON	19T-524	31.86	30	16.5	-9.1	37
28	NAGEEZI 2	19T-525A	33.94	58	10.3	6.6	7
29							0
30	ROCK SPRINGS	16T-608	74.57	*81*	15.9	-21.2	-21
31	TSAYATOH	16T-584	20.22	70	3.8	38.6	39
32	MEX SPGS E-2	14T-502	0.00				
33	MEX SPGS E-1A	14T-589	6.12	68	3.1	40.7	
34	MEX SPGS E-1B	14T-589	8.99	56	3.8	30.9	
35	MEX SPGS W-2	14T-322	4.53	13	8.7	2.9	
36	MEX SPGS W-1	14T-588	5.41	10	8.8	2.2	77
37	NASCHITTI 1	14T-535	53.09	92	9.9	13.0	
38	NASCHITTI 2	14T-594	23.55	52	7.8	14.7	28
39	NEWCOMB 3	12T-312	43.68	67	19.5	-33.8	
40	NEWCOMB 2	12T-587	8.43	19	7.6	5.5	
41	NEWCOMB 1	12T-618	0.00				-28
42	SANOSTEE N	12T-512	35.08	56	9.1	10.9	
43	TOCITO	12T-633	14.40	0	0.0	0.0	
44	SANOSTEE S	12T-655	28.35	32	18.8	-14.6	
45	SANOSTEE W	12T-662	18.69	51	8.5	12.0	
46	RED VALLEY S	12T-519	32.83	72	9.5	12.1	
47	LITTLEWATER	12T-590	0.00				20
48	WASHINGTN PASS	12-0705	74.51	95	10.8	7.7	
49	SHEEP SPGS S	12T-588	17.91	33	13.2	-2.7	
50	SHEEP SPGS N	12T-557	0.00				5
51	TOHATCHI	14T-514	104.14	130	11.8	1.7	
52	BUFFALO SPS 1	14T-569	14.86	56	5.0	26.3	
53	BUFFALO SPS 2	14T-569	87.47	??	??	??	28
54	TWIN LAKES	14T-531	88.76	147	9.2	27.7	28
55	TOADLENA 2	12-0760	73.04	98	10.6	9.2	
56	TOADLENA 3	12-0766	0.00	0	0.7	0.0	
57	TOADLENA 1	12T-611	23.65	67			9
58	OJO ENCINO N	15-0583	37.38	97	6.1	38.5	38
59	TORREON 4	00-5114	25.43	21	14.5	-3.5	
60	TORREON 1	19T-514	76.47	93	11.7	1.9	
61	TORREON 2	19T-515	18.51	25	4.1	13.3	
62	TORREON 3	19T-516	23.61	31	10.4	3.3	15
63							0
64							0
65	BONITO 5	18-0654	23.58	16	4.0	8.6	
66	BONITO 4	18K-327	191.95	197	16.4	-58.3	
67	COALMINE G-2	18T-517	0.00				
68	COALMINE G-4	18T-551	35.31	47	9.2	8.8	
69	COALMINE G-5	18T-574	38.33	88	6.3	33.7	
70	SLICK ROCK F-3	18T-577	18.80	21	14.1	-3.0	
71	SLICK ROCK A-1	18T-582	57.32	*49*	0.5	37.9	
72	SLICK ROCK A-2	18T-583	81.11	51	19.8	-26.7	
73	BLACK CREEK 1	18T-592	26.02	32	10.9	2.4	
74	BLACK CREEK 3	18T-593A	109.27	71	2.1	47.2	
75	BLACK CREEK 4	18T-597	33.15	64	4.8	31.0	
76	BLACK CREEK 5	18T-605	47.47	78	4.6	38.8	
77	BLACK CREEK 2	18T-606	80.85	32	10.9	2.4	
78	BONITO CYN C-1	18T-611	0.00				
79	BONITO CYN C-2	18T-612	0.00				
80	BONITO 3	18T-613	105.91	76	18.9	-35.2	88
81	WINDOW ROCK 1	18A-174B	16.99	103	4.6	51.2	
82	WINDOW ROCK 2	18K-301	17.01	28	6.8	9.8	
83	WINDOW ROCK 3	18T-609	10.08	19	6.4	7.2	
84	HUNTERS POINT	18T-570	98.03	286	8.8	61.5	130

Table 2: Exisiting and Proposed Well Depths and Aquifers for Navajo-Gallup Project Navajo Chapters

	NTUA WELL NAME	CURRENT AQUIFER SOURCE	CURRENT WELL DEPTH	NGWSP SERVICE SUBAREA	PRIMARY CHAPTER WELL LOCATION	MOST LIKELY AQUIFER FOR ADDITIONAL GROUND WATER DEVELOPMENT FOR EACH NAVAJO CHAPTER	ESTIMATED DEPTH OF WELL IN FEET
1		N/A	N/A	CENTRAL	BURNHAM	POINT LOOKOUT	300
2	LAKE VALLEY 1	ALLUVIAL	68	CENTRAL	LAKE VALLEY		
3	LAKE VALLEY 2	ALLUVIAL	83	CENTRAL	LAKE VALLEY	ALLUVIAL	90
4		N/A	N/A	CENTRAL	WHITE ROCK	ALLUVIAL AT LAKE VALLEY	90
5	WHITEHORSE LAK	MENEFEE	404	CENTRAL	WHITEHORSE LAKE	MENEFEE	500
6		N/A	N/A	CROWNPOINT	BECENTI	WESTWATER AT CROWNPOINT	2400
7	COYOTE CYN 1-B			CROWNPOINT	COYOTE CANYON		
8	COYOTE CYN 1	MENEFEE	2520	CROWNPOINT	COYOTE CANYON	MENEFEE	2600
9	CROWNPOINT 1	WESTWATER	2345	CROWNPOINT	CROWNPOINT		
10	CROWNPOINT 2	WESTWATER	2377	CROWNPOINT	CROWNPOINT	WESTWATER	2400
11	DZILTHNAODIT 1			CROWNPOINT	DALTON PASS	WESTWATER	2600
12	LITTLE WATER	WESTWATER	2605	CROWNPOINT	LITTLE WATER	WESTWATER	2700
13	STANDING ROCK	WESTWATER	2688	CROWNPOINT	STANDING ROCK	WESTWATER	2700
14	BREAD SPRINGS	GALLUP	1800	GALLUP	BREAD SPRINGS	GALLUP	2000
15		N/A	N/A	GALLUP	CHICHILTAH	GALLUP AT BREAD SPRINGS	2000
16	CHURCHROCK A	CHINLE	148	GALLUP	CHURCH ROCK		
17	CHURCHROCK B	CHINLE	148	GALLUP	CHURCH ROCK		
18	CHURCHROCK E	CHINLE	88	GALLUP	CHURCH ROCK		
19	CHURCHROCK UNC	CHINLE	56	GALLUP	CHURCH ROCK	ALLUVIAL	160
20	IYANBITO 2	SAN ANDREAS/GLORIETTA	1419	GALLUP	IYANBITO		
21	IYANBITO 1	SAN ANDREAS/GLORIETTA	1171	GALLUP	IYANBITO	SAN ANDREAS/GLORIETTA	1500
22	MARIANO LAKE 1	WESTWATER	1640	GALLUP	MARIANO LAKE		
23	MARIANO LAKE 2	ENTRADA	1610	GALLUP	MARIANO LAKE	ENTRADA	1700
24		N/A	N/A	GALLUP	PINEDALE	ENTRADA AT MARIANO LAKE	1700
25	RED ROCK	GALLUP	1534	GALLUP	RED ROCK	GALLUP	1600
26	KEYAH 1	OJO ALAMO	709	HUERFANO	HUERFANO		
27	CARSON	OJO ALAMO	420	HUERFANO	HUERFANO	OJO ALAMO	800
28	NAGEEZI 2	OJO ALAMO	1055	HUERFANO	NAGEEZI	OJO ALAMO	1100
29		N/A	N/A	ROCK SPRINGS	MANUELITO	GALLUP AT ROCK SPRINGS	1900
30	ROCK SPRINGS	GALLUP	1760	ROCK SPRINGS	ROCK SPRINGS	GALLUP	1900
31	TSAYATOH	GALLUP	1321	ROCK SPRINGS	TSAYATOH	GALLUP	1400
32	MEX SPGS E-2	POINT LOOKOUT	423	ROUTE 666	MEXICAN SPRINGS		
33	MEX SPGS E-1A	POINT LOOKOUT	700	ROUTE 666	MEXICAN SPRINGS		
34	MEX SPGS E-1B	POINT LOOKOUT		ROUTE 666	MEXICAN SPRINGS		
35	MEX SPGS W-2	POINT LOOKOUT	345	ROUTE 666	MEXICAN SPRINGS		
36	MEX SPGS W-1	POINT LOOKOUT	802	ROUTE 666	MEXICAN SPRINGS	POINT LOOKOUT	900
37	NASCHITTI 1		1610	ROUTE 666	NASCHITTI		
38	NASCHITTI 2		1508	ROUTE 666	NASCHITTI	MENEFEE	1700
39	NEWCOMB 3		1420	ROUTE 666	NEWCOMB		
40	NEWCOMB 2	MENEFEE	1140	ROUTE 666	NEWCOMB		
41	NEWCOMB 1		1440	ROUTE 666	NEWCOMB	POINT LOOKOUT	1500
42	SANOSTEE N	WESTWATER	1490	ROUTE 666	SANOSTEE		
43	TOCITO	WESTWATER	2125	ROUTE 666	SANOSTEE		
44	SANOSTEE S	WESTWATER	1530	ROUTE 666	SANOSTEE		
45	SANOSTEE W	WESTWATER	1751	ROUTE 666	SANOSTEE		
46	RED VALLEY S	DAKOTA	1287	ROUTE 666	SANOSTEE		
47	LITTLEWATER	DAKOTA	796	ROUTE 666	SANOSTEE	WESTWATER	1900
48	WASHINGTN PASS	MENEFEE	2713	ROUTE 666	SHEEPSPRINGS		
49	SHEEP SPGS S	MENEFEE	1278	ROUTE 666	SHEEPSPRINGS		
50	SHEEP SPGS N	POINT LOOKOUT	1448	ROUTE 666	SHEEPSPRINGS	MENEFEE	1400
51	TOHATCHI	POINT LOOKOUT	1760	ROUTE 666	TOHATCHI		
52	BUFFALO SPS 1	GALLUP	1580	ROUTE 666	TOHATCHI		
53	BUFFALO SPS 2	GALLUP		ROUTE 666	TOHATCHI	POINT LOOKOUT	1900
54	TWIN LAKES	WESTWATER	3246	ROUTE 666	TWIN LAKES	WESTWATER	3500
55	TOADLENA 2	ALLUVIAL	16	ROUTE 666	TWO GREY HILLS		
56	TOADLENA 3	DECHELLY	997	ROUTE 666	TWO GREY HILLS		
57	TOADLENA 1	DECHELLY	850	ROUTE 666	TWO GREY HILLS	DECHELLY	1100
58	OJO ENCINO N	OJO ALAMO	1057	TORREON	COUNSELOR	OJO ALAMO	1100
59	TORREON 4	OJO ALAMO		TORREON	OJO ENCINO		
60	TORREON 1	OJO ALAMO	767	TORREON	OJO ENCINO		
61	TORREON 2	OJO ALAMO	758	TORREON	OJO ENCINO		
62	TORREON 3	OJO ALAMO	1009	TORREON	OJO ENCINO	OJO ALAMO	1200
63				TORREON	PUEBLO PINTADO	CLIFF HOUSE	500
64				TORREON	TORREON	OJO ALAMO AT OJO ENCINO	1200
65	BONITO 5	ALLUVIAL	39	WINDOW ROCK	FORT DEFIANCE		
66	BONITO 4	ALLUVIAL	33	WINDOW ROCK	FORT DEFIANCE		
67	COALMINE G-2	GALLUP	1680	WINDOW ROCK	FORT DEFIANCE		
68	COALMINE G-4	GALLUP	1750	WINDOW ROCK	FORT DEFIANCE		
69	COALMINE G-5	GALLUP	856	WINDOW ROCK	FORT DEFIANCE		
70	SLICK ROCK F-3	GALLUP	865	WINDOW ROCK	FORT DEFIANCE		
71	SLICK ROCK A-1	GALLUP	1164	WINDOW ROCK	FORT DEFIANCE		
72	SLICK ROCK A-2	GALLUP	1390	WINDOW ROCK	FORT DEFIANCE		
73	BLACK CREEK 1	DECHELLY	957	WINDOW ROCK	FORT DEFIANCE		
74	BLACK CREEK 3	ALLUVIAL	81	WINDOW ROCK	FORT DEFIANCE		
75	BLACK CREEK 4	ALLUVIAL	141	WINDOW ROCK	FORT DEFIANCE		
76	BLACK CREEK 5	ALLUVIAL	89	WINDOW ROCK	FORT DEFIANCE		
77	BLACK CREEK 2	ALLUVIAL	80	WINDOW ROCK	FORT DEFIANCE		
78	BONITO CYN C-1	ALLUVIAL	39	WINDOW ROCK	FORT DEFIANCE		
79	BONITO CYN C-2	ALLUVIAL	32	WINDOW ROCK	FORT DEFIANCE		
80	BONITO 3	ALLUVIAL	27	WINDOW ROCK	FORT DEFIANCE	GALLUP	1900
81	WINDOW ROCK 1	ALLUVIAL	746	WINDOW ROCK	SAINT MICHEALS		
82	WINDOW ROCK 2	DECHELLY	802	WINDOW ROCK	SAINT MICHEALS		
83	WINDOW ROCK 3	DECHELLY	290	WINDOW ROCK	SAINT MICHEALS		
84	HUNTERS POINT	SHINARUMP	198	WINDOW ROCK	SAINT MICHEALS	DECHELLY	900

Table 3: Estimated Well Production Rate and Unit Cost for Proposed Wells in Navajo-Gallup Project Service Area

PRIMARY CHAPTER WELL LOCATION	2005 NTUA GROUND WATER (G.W.) PRODUCTION BY CHAPTER	ESTIMATED PRODUCTION RATE IN GALLONS PER MINUTE	ESTIMATED MAXIMUM PRODUCTION RATE PER WELL IN ACRE-FEET PER YEAR WITH PUMP RUNNING 12 HOURS PER DAY	ESTIMATED MAXIMUM PRODUCTION RATE PER WELL IN ACRE-FEET PER YEAR WITH PUMP RUNNING 18 HOURS PER DAY	Estimated Cost of Wellhouse, Electrical, Power Extension, Water Line Extension	ESTIMATED COST OF WELL PER FOOT BASED ON ESTIMATED DEPTH
BURNHAM		30	24	36	$100,000	$250
LAKE VALLEY						
LAKE VALLEY	22.01	25	20	30	$100,000	$200
WHITE ROCK	0.00	25	20	30	$100,000	$200
WHITEHORSE LAKE	5.90	15	12	18	$100,000	$250
BECENTI		150	121	181	$100,000	$400
COYOTE CANYON						
COYOTE CANYON	37.14	30	24	36	$100,000	$400
CROWNPOINT						
CROWNPOINT	235.71	150	121	181	$100,000	$400
DALTON PASS	54.74	130	105	157	$100,000	$400
LITTLE WATER	78.23	150	121	181	$100,000	$400
STANDING ROCK	33.03	100	81	121	$100,000	$400
BREAD SPRINGS	51.60	100	81	121	$100,000	$400
CHICHILTAH		100	81	121	$100,000	$400
CHURCH ROCK						
CHURCH ROCK						
CHURCH ROCK						
CHURCH ROCK	62.50	25	20	30	$100,000	$200
IYANBITO						
IYANBITO	48.96	100	81	121	$100,000	$350
MARIANO LAKE						
MARIANO LAKE	132.26	100	81	121	$100,000	$400
PINEDALE		100	81	121	$100,000	$400
RED ROCK	93.47	130	105	157	$100,000	$400
HUERFANO						
HUERFANO	53.79	60	48	73	$100,000	$350
NAGEEZI	33.94	60	48	73	$100,000	$350
MANUELITO		80	65	97	$100,000	$400
ROCK SPRINGS	74.57	80	65	97	$100,000	$400
TSAYATOH	20.22	70	56	85	$100,000	$350
MEXICAN SPRINGS						
MEXICAN SPRINGS						
MEXICAN SPRINGS						
MEXICAN SPRINGS						
MEXICAN SPRINGS	25.04	60	48	73	$100,000	$350
NASCHITTI						
NASCHITTI	76.64	60	48	73	$100,000	$400
NEWCOMB						
NEWCOMB						
NEWCOMB	52.10	50	40	60	$100,000	$350
SANOSTEE						
SANOSTEE						
SANOSTEE						
SANOSTEE						
SANOSTEE						
SANOSTEE	129.34	60	48	73	$100,000	$400
SHEEPSPRINGS						
SHEEPSPRINGS						
SHEEPSPRINGS	92.42	40	32	48	$100,000	$350
TOHATCHI						
TOHATCHI						
TOHATCHI	206.46	80	65	97	$100,000	$400
TWIN LAKES	88.76	400	323	484	$100,000	$400
TWO GREY HILLS						
TWO GREY HILLS						
TWO GREY HILLS	96.69	75	60	91	$100,000	$350
COUNSELOR	37.38	80	65	97	$100,000	$350
OJO ENCINO						
OJO ENCINO						
OJO ENCINO						
OJO ENCINO	144.02	80	65	97	$100,000	$350
PUEBLO PINTADO		25	20	30	$100,000	$350
TORREON		80	65	97	$100,000	$350
FORT DEFIANCE						
FORT DEFIANCE						
FORT DEFIANCE						
FORT DEFIANCE						
FORT DEFIANCE						
FORT DEFIANCE						
FORT DEFIANCE						
FORT DEFIANCE						
FORT DEFIANCE						
FORT DEFIANCE						
FORT DEFIANCE						
FORT DEFIANCE						
FORT DEFIANCE						
FORT DEFIANCE						
FORT DEFIANCE	849.07	60	48	73	$100,000	$400
SAINT MICHEALS						
SAINT MICHEALS						
SAINT MICHEALS						
SAINT MICHEALS	142.10	60	48	73	$100,000	$350

Table 5: Alternative 1 Estimated Cost of Ground Water Wells to meet Year 2020 Demands at 80 GPCD

CHAPTERS SERVED BY GROUND WATER COMPONENT OF NAVAJO-GALLUP PROJECT	YEAR 2020 CHAPTER WATER DEMANDS (160 GPCD)	YEAR 2020 CHAPTER WATER DEMANDS (ACRE-FEET BASED ON 80 GPCD)	ADDITIONAL GROUND WATER DEVELOPMENT NEEDED FOR YEAR 2020 DEMAND IN ACRE-FEET BASED ON 80 GPCD	NUMBER OF WELLS NEEDED TO MEET 2020 WATER DEMAND (80 GPCD) AT WITH ALL WELLS RUNNING 12HPD	NUMBER OF WELLS NEEDED TO MEET 2020 WATER DEMAND (80 GPCD)	2006 COST OF GROUND WATER DEVELOPMENT TO MEET YEAR 2020 WATER DEMAND (80 GPCD)	BASIN
BURNHAM	92	46	46.00	1.90	2	$350,000	SAN JUAN
LAKE VALLEY							
LAKE VALLEY	163	81.5	45.61	2.26	3	$354,000	SAN JUAN
WHITE ROCK	75	37.5	37.50	1.86	2	$236,000	SAN JUAN
WHITEHORSE LAKE	228	114	102.99	8.51	9	$2,025,000	SAN JUAN
BECENTI	72	36	SEE CROWNPOINT				SAN JUAN
COYOTE CANYON							
COYOTE CANYON	461	230.5	194.17	8.03	8	$9,120,000	SAN JUAN
CROWNPOINT							
CROWNPOINT	993	496.5	299.16	2.47	3	$3,180,000	SAN JUAN
DALTON PASS	117	58.5	-42.19	-0.40	0	$0	SAN JUAN
LITTLE WATER	238	119	SEE CROWNPOINT				SAN JUAN
STANDING ROCK	94	47	-28.85	-0.36	0	$0	SAN JUAN
BREAD SPRINGS	456	228	410.12	5.09	5	$4,500,000	LITTLE COLORADO
CHICHILTAH	581	290.5	SEE BREAD SPRINGS				LITTLE COLORADO
CHURCH ROCK							
CHURCH ROCK							
CHURCH ROCK							
CHURCH ROCK	665	332.5	275.90	13.68	14	$1,848,000	LITTLE COLORADO
IYANBITO							
IYANBITO	364	182	128.57	1.59	2	$1,250,000	LITTLE COLORADO
MARIANO LAKE							
MARIANO LAKE	271	135.5	111.52	1.38	2	$1,560,000	LITTLE COLORADO
PINEDALE	228	114	SEE MARIANO LAKE				LITTLE COLORADO
RED ROCK	389	194.5	84.46	0.81	1	$740,000	LITTLE COLORADO
HUERFANO							
HUERFANO	191	95.5	4.82	0.10	0	$0	SAN JUAN
NAGEEZI	367	183.5	142.94	2.95	3	$1,455,000	SAN JUAN
MANUELITO	236	118	118.00	1.83	2	$1,720,000	LITTLE COLORADO
ROCK SPRINGS	630	315	261.66	4.06	4	$3,440,000	LITTLE COLORADO
TSAYATOH	536	268	209.20	3.71	4	$2,360,000	LITTLE COLORADO
MEXICAN SPRINGS							
MEXICAN SPRINGS							
MEXICAN SPRINGS							
MEXICAN SPRINGS							
MEXICAN SPRINGS	266	133	31.34	0.65	1	$415,000	SAN JUAN
NASCHITTI							
NASCHITTI	575	287.5	183.19	3.79	8	$6,240,000	SAN JUAN
NEWCOMB							
NEWCOMB							
NEWCOMB	243	121.5	97.67	2.42	3	$1,875,000	SAN JUAN
SANOSTEE							
SANOSTEE							
SANOSTEE							
SANOSTEE							
SANOSTEE							
SANOSTEE	778	389	239.27	4.94	5	$4,300,000	SAN JUAN
SHEEPSPRINGS							
SHEEPSPRINGS							
SHEEPSPRINGS	247	123.5	26.07	0.81	1	$590,000	SAN JUAN
TOHATCHI							
TOHATCHI							
TOHATCHI	601	300.5	65.95	1.02	1	$860,000	SAN JUAN
TWIN LAKES	735	367.5	251.08	0.78	1	$1,500,000	SAN JUAN
TWO GREY HILLS							
TWO GREY HILLS							
TWO GREY HILLS	330	165	59.09	0.98	1	$485,000	SAN JUAN
COUNSELOR	510	255	179.15	2.78	3	$1,455,000	SAN JUAN
OJO ENCINO							
OJO ENCINO							
OJO ENCINO							
OJO ENCINO	223	111.5	207.53	3.22	3	$1,560,000	RIO GRANDE
PUEBLO PINTADO	176	88	88.00	4.36	5	$1,375,000	SAN JUAN
TORREON	510	255	SEE OJO ENCINO				RIO GRANDE
FORT DEFIANCE							
FORT DEFIANCE							
FORT DEFIANCE							
FORT DEFIANCE							
FORT DEFIANCE							
FORT DEFIANCE							
FORT DEFIANCE							
FORT DEFIANCE							
FORT DEFIANCE							
FORT DEFIANCE							
FORT DEFIANCE							
FORT DEFIANCE							
FORT DEFIANCE							
FORT DEFIANCE							
FORT DEFIANCE	2086	1043	106.36	2.20	2	$1,720,000	LITTLE COLORADO
SAINT MICHEALS							
SAINT MICHEALS							
SAINT MICHEALS							
SAINT MICHEALS	2312	1156	884.22	18.27	19	$7,885,000	LITTLE COLORADO

Table 7: Alternative 2 Estimated Cost of Ground Water Wells to meet Year 2020 Demands at 80 GPCD

CHAPTERS SERVED BY GROUND WATER COMPONENT OF NAVAJO-GALLUP PROJECT	BASIN	AMOUNT OF ADDITIONAL WATER NEEDED TO FROM WELLS RUNNING 18HPD TO MEET 2020 DEMANDS AT 80 GPCD AFTER FIRST 2 WELLS RUNNING AT 12HPD ARE SUBTRACTED	NUMBER OF WELLS NEEDED TO MEET 2020 WATER DEMAND (80 GPCD) AT 18HPD FOR REST	TOTAL NUMBER OF WELLS NEEDED	2006 COST OF GROUND WATER DEVELOPMENT TO MEET YEAR 2020 WATER DEMAND (80 GPCD)
BURNHAM	SAN JUAN	-2	-0.07	2	$350,000
LAKE VALLEY					
LAKE VALLEY	SAN JUAN	5	0.17	2	$236,000
WHITE ROCK	SAN JUAN	-3	-0.09	2	$236,000
WHITEHORSE LAKE	SAN JUAN	79	4.34	7	$1,575,000
BECENTI	SAN JUAN				
COYOTE CANYON					
COYOTE CANYON	SAN JUAN	146	4.02	6	$6,840,000
CROWNPOINT					
CROWNPOINT	SAN JUAN	57	0.32	3	$3,180,000
DALTON PASS	SAN JUAN	-252	-1.60	0	$0
LITTLE WATER	SAN JUAN				
STANDING ROCK	SAN JUAN	-190	-1.57	0	$0
BREAD SPRINGS	LITTLE COLORADO	249	2.06	4	$3,600,000
CHICHILTAH	LITTLE COLORADO				
CHURCH ROCK					
CHURCH ROCK					
CHURCH ROCK					
CHURCH ROCK	LITTLE COLORADO	236	7.79	10	$1,320,000
IYANBITO					
IYANBITO	LITTLE COLORADO	-33	-0.27	1	$625,000
MARIANO LAKE					
MARIANO LAKE	LITTLE COLORADO	-50	-0.41	1	$780,000
PINEDALE	LITTLE COLORADO				
RED ROCK	LITTLE COLORADO	-125	-0.80	1	$740,000
HUERFANO					
HUERFANO	SAN JUAN	-92	-1.27	0	$0
NAGEEZI	SAN JUAN	46	0.64	3	
MANUELITO	LITTLE COLORADO	-11	-0.11	2	$1,720,000
ROCK SPRINGS	LITTLE COLORADO	133	1.37	4	$3,440,000
TSAYATOH	LITTLE COLORADO	96	1.14	3	$1,770,000
MEXICAN SPRINGS					
MEXICAN SPRINGS					
MEXICAN SPRINGS					
MEXICAN SPRINGS					
MEXICAN SPRINGS	SAN JUAN	-65	-0.90	1	$415,000
NASCHITTI					
NASCHITTI	SAN JUAN	86	1.19	3	$2,340,000
NEWCOMB					
NEWCOMB					
NEWCOMB	SAN JUAN	17	0.28	3	$1,875,000
SANOSTEE					
SANOSTEE					
SANOSTEE					
SANOSTEE					
SANOSTEE					
SANOSTEE	SAN JUAN	142	1.96	4	$3,440,000
SHEEPSPRINGS					
SHEEPSPRINGS					
SHEEPSPRINGS	SAN JUAN	-38	-0.79	1	$590,000
TOHATCHI					
TOHATCHI					
TOHATCHI	SAN JUAN	-63	-0.65	1	$860,000
TWIN LAKES	SAN JUAN	-394	-0.81	1	$1,500,000
TWO GREY HILLS					
TWO GREY HILLS					
TWO GREY HILLS	SAN JUAN	-62	-0.68	1	$485,000
COUNSELOR	SAN JUAN	50	0.52	3	$1,455,000
OJO ENCINO					
OJO ENCINO					
OJO ENCINO					
OJO ENCINO	RIO GRANDE	78	0.81	3	$1,560,000
PUEBLO PINTADO	SAN JUAN	48	1.58	4	$1,100,000
TORREON	RIO GRANDE				
FORT DEFIANCE					
FORT DEFIANCE					
FORT DEFIANCE					
FORT DEFIANCE					
FORT DEFIANCE					
FORT DEFIANCE					
FORT DEFIANCE					
FORT DEFIANCE					
FORT DEFIANCE					
FORT DEFIANCE					
FORT DEFIANCE					
FORT DEFIANCE					
FORT DEFIANCE					
FORT DEFIANCE					
FORT DEFIANCE					
FORT DEFIANCE					
FORT DEFIANCE	LITTLE COLORADO	10	0.13	2	$1,720,000
SAINT MICHEALS					
SAINT MICHEALS					
SAINT MICHEALS					
SAINT MICHEALS	LITTLE COLORADO	787	10.85	13	$5,395,000

Attachment C

Water Capital Improvement Plan: Years 2010 - 2014

Summary

District: Shiprock, Crown Point and Fort Defiance (NEW MEXICO ONLY)

	2010	2011	2012	2013	2014	Grand Total
Shiprock	393,406.00	891,581.00	764,151.00	1,733,043.00	822,965.00	**4,605,146.00**
Crownpoint	314,201.00	666,853.00	927,999.00	495,390.00	704,774.00	**3,109,217.00**
Fort Defiance	133,906.00	387,395.00	325,836.00	181,637.00	65,974.00	**1,094,748.00**
Head Quarters-CE	269,359.00	3,366,172.00	10,417.00	65,407.00	5,361.00	**3,716,716.00**
HQ-Well Ops		1,102,071.00	1,221,303.00	1,422,799.00	714,380.00	**4,460,553.00**
Treatment	787,070.00	1,448,818.00	1,541,460.00	840,677.00		**4,618,025.00**
Grand Total	**1,897,942.00**	**7,862,890.00**	**4,791,166.00**	**4,738,953.00**	**2,313,454.00**	**21,604,405.00**

Water Capital Improvement Plan: Years 2010 - 2014

Shiprock Water CIP

District:

						Use 2009 Cost Estimations						
	Category	Prioritization	Year of Construction	Project Location	Description	Material Cost	Labor Cost	Equipment Cost	Miscellaneous Cost	A&G Overhead	2009 Construction Cost	Cost by Year of Construction
1	Trans & Distr	Reliability	2010	Upper Fruitland	Upgrade old 3" PRV TO 4"	24,500	28,000	7,000	5,500	29,250	94,250	96,710
2	Trans & Distr	Growth	2010	Shiprock express	replace 400' of old 6" AC pipe, currently installed under heavy traffic area.	3,900	2,700	2,000	1,800	4,680	15,080	15,474
3	Trans & Distr	Reliability	2010	NAPI Booster	Upgrade the electrical controls at NAPI Booster#3. This is complete overall upgrade to the control panels.	7,000	2,000	800	500	4,635	14,935	15,325
4	Trans & Distr	Reliability	2010	Shiprock	To replace 5,500 feet of old 4" Ductile Iron pipe with 6 " pvc pipe for WWTP.	19,000	23,000	10,500	1,000	24,075	77,575	79,600
5	Trans & Distr	Reliability	2010	Myerson Resident	replace 200' of old 1" plastic pipe with 150 ' PVC and 50' PE up to meter	1,100	2,500	1,400	1,100	2,745	8,845	9,076
6	Trans & Distr	Reliability	2010	Franklin Resident to Mustang	Replace 300' of old 1 1/4" pipe with 2" PVC	8,500	15,000	9,500	2,000	15,750	50,750	52,075
7	Trans & Distr	Reliability	2010	Old Water Treatment Plant	To install wireless communication system .	8,000	3,000	2,200	200	6,030	19,430	19,937
8	Trans & Distr	Reliability	2010	Shiprock Farm "A"	System Improvement(5) Upgrade I inch service line from tap to meter yokes.	1,300	2,500	1,700	300	2,610	8,410	8,630
9	Trans & Distr	Reliability	2010	Upper Fruitland	Install 4 flush valves in Upper Fruitland NW of of NHA housing 2" galvanize pipe	6,000	3,200	2,800	1,000	5,850	18,850	19,342
10	Trans & Distr	Reliability	2010	Nageezi	upgrade old PRV and vaults	15,574	25,956	8,825	1,557	23,360	75,272	77,237
11	Trans & Distr	Reliability	2011	Morgan Lake Booster	To upgrade the control panel to SCADA system with sensing mode which maintain water level in the storage tank. New in-line Grundfos pump C-10	36,000	27,000	15,000	5,000	37,350	120,350	126,714
12	Trans & Distr	Reliability	2011	Morgan Lake Tank	Upgrade DC tank panel, 900 MHZ Antenna, Solar Panels, plumbing and conduit work.	18,800	5,500	3,300	800	12,780	41,180	43,358
13	Trans & Distr	Reliability	2011	Shiprock 10" line	Repair to the Shiprock River Bridge 10" water line hanging underthe bridge (insulate pipe)	2,000	3,000	1,500	200	3,015	9,715	10,229
14	Trans & Distr	Reliability	2011	Beclabito Booster #1	Upgrade the control panel to SCADA, 3 phase paq, booster paq plumbing, 900 MHZ Antenna and Power configuration	65,000	16,000	96,000	1,000	80,100	258,100	271,748
15	Trans & Distr	Reliability	2011	Beclabito Booster #2	Upgrade the control panel to SCADA, 3 phase paq, booster paq plumbing, 900 MHZ Antenna and Power configuration	66,000	15,500	93,000	1,000	78,975	254,475	267,932
16	Trans & Distr	Reliability	2011	Shiprock Farm " B "	System Improvement (3)Upgrade I inch service line from tap to meter yokes.	1,200	2,200	1,500	400	2,385	7,685	8,092
17	Trans & Distr	Reliability	2011	Farmington transmission Line	To install 2 ea. Mainline gatevalve on 18" and 16" 1 st phase 4 miles apart.	19,000	40,000	6,000	7,000	32,400	104,400	109,921
18	Trans & Distr	Reliability	2011	Shiprock	Upgrade the upper portion of the regulating staion building with new Gas chlorine equipment for disinfection the transmission line.	10,000	6,000	2,000	700	8,415	27,115	28,549
19	Trans & Distr	Reliability	2011	Keyah one	To upgrade and replace probe wire and radio teleemtry system with controls panel. At the storage facility to the well site.	12,000	3,000	1,000	400	7,380	23,780	25,038
20	Trans & Distr	Reliability	2012	Shiprock South Transmission 14" line	There is a 14" concrete-lined pipe from Fairchild tank vault running to Gallup Storage tank. This line has served this particular area for number of years and has had it share of leaks. Directional Boring 1500 feet.	115,000	35,000	3,500	1,000	69,525	224,025	242,028
21	Trans & Distr	Reliability	2012	Farmington transmission Line	to upgrade 6 vaults sites by replacing existing 2" spring loaded with 2" cla-vals	22,300	11,000	7,000	1,000	18,585	59,885	64,698
22	Trans & Distr	Reliability	2012	NAPI Booster #2	To upgrade and replace the pitless units with vertical in-line pumps with new plumbing and re-do the floor by sloping and installing a drainage line.	25,000	21,000	7,000	1,200	24,390	78,590	84,906
23	Trans & Distr	Reliability	2012	Shiprock Mesa tank	Install an altitude valve to regulate Mesa Tank water level.	9,000	3,000	1,000	500	6,075	19,575	21,148
24	Pumping	Reliability	2012	Rattlesnake Booster	To upgrade the submersable pumps to in-line pumps using Grundfos Centrifugal CR10 w/new telemetry system.	55,000	35,000	18,000	10,000	53,100	171,100	184,850
25	Trans & Distr	Reliability	2012	Beclabito #3	Upgrade the control panel to SCADA, 3 phase paq, booster paq plumbing, 900 MHZ Antenna and Power configuration	62,500	16,000	9,600	1,000	40,095	129,195	139,577
26	Trans & Distr	Reliability	2012	Beclabito Tank #3	Upgrade DC tank panel, 900 MHZ Antenna, Solar Panels, plumbing and conduit work.	9,500	4,500	2,700	500	7,740	24,940	26,944
27	Trans & Distr	Reliability	2012	Shiprock Distribution	1st. To install 2 major mainline PRV's station w/vaults Shiprock South area.	10,000	7,000	2,000	500	8,775	28,275	30,547
28	Trans & Distr	Reliability	2012	Farmington Transmission Line	2nd phase to install 2 major mainline gate valves on 18" and 16" 4 miles apart.	19,000	8,000	3,000	700	13,815	44,515	48,092
29	Trans & Distr	Reliability	2012	Shiprock Storage tank	2 million gal. tank install a protective/safety cage around the ladder.	2,500	2,500	1,700	250	3,128	10,078	10,888
30	Trans & Distr	Reliability	2012	Farmington transmission Line	To change out numerous air-relief valves and protective corrugated cans from the reservation border line into Hogback. The equipment constructed back in 1969.	17,000	22,000	6,000	2,000	21,150	68,150	73,627
31	Trans & Distr	Reliability	2012	Shiprock BIA Meter	BIA entrance south side to upgrade the plumbing w/ by pass replace 6" meter with new vault. And accommodate for traffic area.	17,000	12,000	7,000	5,000	18,450	59,450	64,228
32	Trans & Distr	Regulatory	2013	Farmington Distribution Line	To upgrade 4 existing 2" prv's with vaults 2" X 2" X 3/4" to NTUA standard.	48,000	29,000	17,500	14,000	48,825	157,325	174,403

Date Printed: 10/26/2011

33	Trans & Distr	Regulatory	2013	Carson Storage tank	To upgrade and increase tank height to Tank #1 (south). The tank is about 16 feet in height and not situated on higher ground compared to some surrounding homes. This should resolve some pressure concerns the surrounding residence.	75,000	30,000	15,000	10,000	58,500	188,500	208,963
34	Trans & Distr	Reliability	2013	Farmington transmission Line	Replacement or addition to the Farmington 14" ductile Iron waterline. This is a small stretch of waterline extending from 500,000 gal storage tank in Morgan Lake area down to lower Fruitland.	100,000	37,000	3,000	1,000	63,450	204,450	226,644
35	Trans & Distr	Safety	2013	NAPI Booster #3	To upgrade and replace the pitless units with vertical in-line pumps with new plumbing and re-do the floor by sipoing and installing a drainage line.	60,000	36,000	21,600	18,000	61,020	196,620	217,965
36	Trans & Distr	Reliability	2013	Farmington Line	To change out numerous air-relief valves and protective corrugated cans from the Hogback line into Shprock . The equipment constructed back in 1969.	18,000	24,000	9,000	1,500	23,625	76,125	84,390
37	Trans & Distr	Reliability	2013	Farmington Transmission Line	To replace the existing wires and test stations on the transmission line using standard cathodic Protection materials.	7,000	13,000	7,000	1,000	12,600	40,600	45,008
38	Trans & Distr	Reliability	2013	Hogback Distribution	Install 4 gate valves past vault #14 and vault #9 in Hogback. The gatevalves will be strategic areas and will be needed to minimize the outages.	5,500	4,700	4,300	900	6,930	22,330	24,755
39	Trans & Distr	Reliability	2013	NAPI Booster # 4	Upgrade the Jacuzzi pump to Groundfus pumps and plumbing. Upgrade control panel w/telemetry system. Fabricated building to housing the equipment.	36,000	27,000	15,000	5,000	37,350	120,350	133,415
40	Trans & Distr	Reliability	2013	Newcomb pumphouse	To upgrade the electrical controls at Newcomb pumphouse #1 located by the Bus Barn. This will be a complete overall upgrade to include telemtry system	25,000	12,000	7,000	5,000	22,050	71,050	78,762
41	Trans & Distr	Reliability	2013	Newcomb Storage Tank	To create more storage for the Newcomb system. There is already three storage tanks with a combine capacity of 120,000 gals. The suggestion is to increase the height of the tank to not only address the capacity, but to create additional pressure for surrounding areas. Need 56,000 gal. 24 feet height	100,000	25,000	14,000	5,000	64,800	208,800	231,468
42	Trans & Distr	Reliability	2013	Sanostee Distribution	To replace existing 4" ductile iron pipe in 4 areas. The replacement with HDPE line directional boring.	20,000	14,000	15,000	700	22,365	72,065	79,888
43	Trans & Distr	Reliability	2013	Farmington transmission Line	The 3rd phase to install 2 major mainline gatevalves w/ vaults , more isolating valves to minimize the water outage during repairs. In some cases the valves are 4 miles apart. This create a problem when depressurizing the line. 18" and 16" lines	19,000	8,000	3,000	700	13,815	44,515	49,347
44	Supply	Reliability	2013	Mittenrock Pitless Well	To install and upgrade the well head to more sanitary-type seal Presently using a doghouse addition.	8,000	6,000	4,000	1,500	8,775	28,275	31,344
45	Trans & Distr	Reliability	2013	Nageezi well #2	Relocate or set up a pumphouse out side well site #2. This will include a new structure, new plumbing, new chemical system, etc. currently, no pumphouse facility on site, but only electrical control panel with fence.	115,000	70,000	40,000	33,000	116,100	374,100	414,712
46	Meter	Reliability	2013	Shiprock Meter Vault	Mesa elementary School: Upgrade plumbing, meter bypass set up for the master meter. Need to upgrade to current standard which will include installation of cla-val to regulate the flows. Replace 6" diameter standard vault and accommodate for traffic areas.	18,000	6,000	3,500	2,000	13,275	42,775	47,418
47	Meter	Reliability	2013	Shiprock Meter Vault	Nizhoni Elementary School; upgrade plumbing, meter, by pass set-up for the master meter. Upgrade to current standard which include installation of cla-val to regulate the flows. Replace the vault to a 6" diameter standard vault.	18,000	6,000	3,500	2,000	13,275	42,775	47,418
48	Trans & Distr	Reliability	2014	Red Valley South	To replace 4 PRV's on the distribution line Red Valley south area. The PRV's should have 2" x 2" x 3/4" standard set-up including 8ft. X 4 ft. vaults and 2" flush valves before the in-let.	48,000	15,000	11,000	5,000	35,550	114,550	130,300
49	Trans & Distr	Reliability	2014	Shiprock Meter Vault	BIA Northeast Entrance; Upgrade plumbing, meter, bypass set-up for the master meter. Upgrade to currnet standard which will include installationof cla-vals to regulate the flows.	18,000	6,000	3,500	2,000	13,275	42,775	48,656
50	Trans & Distr	Reliability	2014	Shiprock Regulating Station	Removal of metal structure curently housing the meter regulating station near San Juan Bridge. The metal is on top half of a vault and is a building like structure that can be re-use as a storage building elsewhere. Replace by removalbe concrete slab. Building prone to graffiti and vandalism.	15,000	12,000	5,000	600	14,670	47,270	53,770
					TOTAL	1,442,174	783,756	536,425	164,007	1,316,863	4,243,225	4,605,146

Date Printed: 10/26/2011

Water Capital Improvement Plan: Years 2010 - 2014
Crownpoint Water CIP
District:

						Use 2009 Cost Estimations						
	Category	Prioritization	Year of Construction	Project Location	Description	Material Cost	Labor Cost	Equipment Cost	Miscellaneous Cost	A&G Overhead	2009 Construction Cost	Cost by Year of Construction
1	Trans & Distr	Reliability	2010	Torreon Wash Crossing	Replace 250 ft of 6 inch PE with 4" HDPE, for wash crossing using directional Bore	4,500	6,500	18,198	16,390	20,515	66,103	67,828
2	Trans & Distr	Reliability	2010	Hardground Canyon Wash Crossing	Replace 360 ft of 8-inch PE with 8" HDPE, for wash crossing using directioal bore	7,500	21,300	6,600	9,912	20,390	65,702	67,417
3	Trans & Distr	Reliability	2010	Churchrock Wash Crossing	Replace 300 ft of 4-inch PE with 4" HDPE, for wash crossing using directional bore	3,750	4,350	12,000	5,628	11,578	37,306	38,280
4	Trans & Distr	Reliability	2010	Red Rock wash crossing	Replace 600 ft of 6 inch PE with 6" HDPE, for wash crossing using directional bore	7,500	5,100	33,400	12,880	26,496	85,376	87,604
5	Trans & Distr	Reliability	2010	Torreon Wash Crossing	Replace 250 ft of 6 inch PE with 4" HDPE, for wash crossing using directional Bore	2,500	4,500	14,750	13,920	16,052	51,722	53,072
6	Treatment	Safety	2011	Torreon Chemical Building	Upgrade the Chemical System at Torreon very old not reliable	15,000	4,500	2,200	700	10,080	32,480	34,198
7	Trans & Distr	Reliability	2011	Mariano Lake 2nd Canyon	Need to Bore across wash crossing, Having a problem with wash outs 100 yards 6" HDPE	4,800	6,800	3,500	4,000	8,595	27,695	29,160
8	Trans & Distr	Reliability	2011	Mariano Lake/Pinedale 1st Canyon	Need to Bore across wash crossing at 1st canyon about 100 yards have problems with wash outs 6" HDPE	4,900	7,000	3,500	4,000	8,730	28,130	29,617
9	Trans & Distr	Reliability	2011	Lake Valley North of BIA School Crossing	Upgrade wash crossing to HDPE not very reliable have wash outs in area a lot	4,900	7,000	3,500	4,000	8,730	28,130	29,617
10	Trans & Distr	Reliability	2011	Tenian Tank Torreon	Upgrade Altitude Valve at Tenian Tank	28,000	7,500	4,000	2,000	18,675	60,175	63,358
11	Trans & Distr	Reliability	2011	Well # 2 Crownpoint	Upgrade the monitoring point to a control building	100,000	80,000	30,000	10,000	99,000	319,000	335,869
12	Trans & Distr	Reliability	2011	JW Booster Pump Thoreau	Upgrade Booster pump at JW Booster in Thoreau it is very slow to start	50,000	30,000	10,000	5,000	42,750	137,750	145,034
13	Trans & Distr	Safety	2012	Smith Lake PRV Vault	Need upgrade PRV vault at Smith Lake Safety issue, outdated PRV no parts.2x2x3/4 prv	30,000	14,000	7,500	2,000	24,075	77,575	83,810
14	Trans & Distr	Reliability	2012	Crownpoint Well #1	Replace new pump house building is sinking tilting uneven foundation causing water breaks need chemical building upgrade-confined space	120,000	50,000	30,000	10,000	94,500	304,500	328,970
15	Trans & Distr	Reliability	2012	Breadsprings across from BIA school	4" wash crossing EXPOSED located across from the Breadsprings school needs directional boring wash outs a big issue. Replace w/ 500 ft of 6" HDPE	6,200	9,400	4,092	4,700	10,976	35,368	38,210
16	Trans & Distr	Reliability	2012	Mission Tank Torreon	Upgrade Altitude Valve Vault at Mission Tank	28,000	7,500	4,000	2,000	18,675	60,175	65,012
17	Trans & Distr	Reliability	2012	Little Water	Replace new pump house w/ motor controls & Telemetry upgrade (tank site telem) Building is sinking on Sandy area motor control parts are obsolete Uneven foundation causing water to break	80,000	30,000	10,000	5,000	56,250	181,250	195,816
18	Trans & Distr	Reliability	2012	Redrock Solenoid Station	Upgrade Solenoid Station vault	40,000	8,000	2,000	3,000	23,850	76,850	83,026
19	Trans & Distr	Reliability	2012	Smith Lake Well #2	Upgrade Pump house old system made of wood	55,000	20,000	8,000	2,000	38,250	123,250	133,155
20												
21	Trans & Distr	Regulatory	2013	Whitehorse Lake	Upgrade wash crossing and ROW crossings	6,200	9,400	4,092	4,700	10,976	35,368	39,207
22	Trans & Distr	Reliability	2013	Pinehaven Tank site	North of Pinehaven tank site 2" wash cross need boring. Replace w 200' of 4" HDPE	3,500	5,000	17,000	14,000	17,775	57,275	63,493
23	Trans & Distr	Reliability	2013	Lake Valley	upgrade to new building for pump house chemical stations	80,000	30,000	15,000	5,000	58,500	188,500	208,963
24	Trans & Distr	Reliability	2013	Wingate booster station	Needs new pump and motors wear and tear of motor/pump failing out	50,000	30,000	10,000	5,000	42,750	137,750	152,703
25	Trans & Distr	Reliability	2013	Kerr McGee Wash Crossing	Need to Bore across wash crossing at Ann Benallie residence. 200 ft, 4" HDPE	2,800	3,900	2,100	2,000	4,860	15,660	17,360
26	Trans & Distr	Reliability	2013	Pinedale Tank Site	Upgrade ALT-valve - no water in Pinedale area due to clay valve operational manual operation of bypass system too time consuming	4,500	2,000	1,000	1,000	3,825	12,325	13,664
27												
28	Trans & Distr	Reliability	2014	Ojo Encino System well #1	Ojo system feeding Pueblo Pintado new school another demand customer Present time: well operating on time clock unit needs altistart unit for motor starter @well 1	40,000	25,000	10,000	5,000	36,000	116,000	131,950
29	Trans & Distr	Reliability	2014	Ojo Encino System well #2	Ojo Encino well #2 needs telementary upgrade in well	40,000	25,000	10,000	5,000	36,000	116,000	131,950

Date Printed: 10/26/2011

30	Trans & Distr	Reliability	2014	Crownpoint Water wells #1	Low wet well control upgrade to transducer installations for each station. Need to upgrade protection there is no protection to pump and motor is water table drops mostly all well probes/transducers not working burning out pump /motors due to low well level	50,000	30,000	20,000	10,000	49,500	159,500	181,430
31	Trans & Distr	Reliability	2014	Casamero lake	upgrade Booster/pumphouse/controls- old system	50,000	30,000	10,000	5,000	42,750	137,750	156,689
32	Trans & Distr	Reliability	2014	Churchrock-UNC WELL	Upgrade to new pumphouse/control room/pumps	45,000	15,000	2,000	300	28,035	90,335	102,755
33										-	-	-
34										-	-	-
35										-	-	-
36										-	-	-
37										-	-	-
38										-	-	-
39										-	-	-
40										-	-	-
41										-	-	-
42										-	-	-
43										-	-	-
44										-	-	-
45										-	-	-
46										-	-	-
47										-	-	-
48										-	-	-
49										-	-	-
50										-	-	-
					TOTAL	964,550	528,750	308,432	174,130	889,138	2,865,000	3,109,217

Water Capital Improvement Plan: Years 2010 - 2014
Fort Defiance CIP
District:

	Category	Prioritization	Year of Construction	Project Location	Description	Use 2009 Cost Estimations: Material Cost	Labor Cost	Equipment Cost	Miscellaneous Cost	A&G Overhead	2009 Construction Cost	Cost by Year of Construction
1	Trans & Distr	Reliability	2010	Mexican Springs East CWS	Replace two thousand feet of 6" PVC Pipe west of the Mexican Springs Well. Existing pipe seems to be UV damaged.	55,000	20,000	10,000	5,000	40,500	130,500	133,906
2	Trans & Distr	Reliability	2011	Twin Lakes Water System	Upgrade 200' of 6" PVC to 6" ductile iron at HWY 491 Road Crossing.	37,500	3,000	4,000	2,000	20,925	67,425	70,991
3										-	-	-
4	Meter	Reliability	2011	/ NAVAJO / CRYSTAL	Water meter change-out program (500 meters per year) Water meters are $158 each.	79,000	26,000	6,000	2,000	50,850	163,850	172,514
5	Trans & Distr	Growth	2011	FD Water Systems - "D" Tanks	Replace altitude valve and put "D" Tanks back in operation for additional storage.	74,000	4,000	4,000	3,000	38,250	123,250	129,768
6	Pumping	Growth	2011	Slick Rock "F" Booster Station	Install a grundfos booster paq with control panel to replace the old centrifugal pumps and the outdated control panels	5,000	2,000	1,500	750	4,163	13,413	14,122
7	Trans & Distr	Reliability	2012	Tohatchi/Mexican Springs Water System Inter-Tie	Replace 2000' of old 8" PVC Pipe west of the Benally Camp.	74,000	10,000	8,000	3,000	42,750	137,750	148,819
8	Meter	Reliability	2012	TOHLAKAI / MEXICAN SPRINGS /TOHATCHI	Water meter change-out program (500 meters per year) Water meters are $35 each.	79,000	26,000	6,000	2,000	50,850	163,850	177,017
9	Meter	Reliability	2013	BUFFALO SPRINGS / NASCHITTI / TSAYATOH / LUPTON	Water meter change-out program (500 meters per year) Water meters are $158 each.	79,000	26,000	6,000	2,000	50,850	163,850	181,637
10	Pumping	Reliability	2014	Navajo/Black Creek Booster Station	Rehabilitate the pumping system at the Black Creek Booster Station, this will allow the transfer of water from the Fort Defiance Water System up in to the Navajo, New Mexico water system	31,000	5,500	2,000	1,500	18,000	58,000	65,974
11										-	-	-
12										-	-	-
13										-	-	-
14										-	-	-
15										-	-	-
16										-	-	-
17										-	-	-
18										-	-	-
19										-	-	-
20										-	-	-
21										-	-	-
22										-	-	-
23										-	-	-
24										-	-	-
25										-	-	-
26										-	-	-
27										-	-	-
28										-	-	-
29										-	-	-
30										-	-	-
31										-	-	-
32										-	-	-
33										-	-	-
34										-	-	-
					TOTAL	513,500	122,500	47,500	21,250	317,138	1,021,888	1,094,748

Date Printed: 10/26/2011

Water Capital Improvement Plan: Years 2010 - 2014
Civil Engr CIP
District:

						Use 2009 Cost Estimations						
	Category	Prioritization	Year of Construction	Project Location	Description	Material Cost	Labor Cost	Equipment Cost	Miscellaneous Cost	A&G Overhead	2009 Construction Cost	Cost by Year of Construction
1	Trans & Distr	Reliability	2010	Slick Rock Wash, Coalmine	Relocate and install new waterline wash crossing: 18" PE/DI 1000+ ft wash crossing, currently exposed.	51,900	64,900	29,200	35,040	81,468	262,508	269,359
2	Meter	Reliability	2011	Shiprock, NM	Automatic Meter infrastructure	1,200,000				540,000	1,740,000	1,832,013
3	Meter	Reliability	2011	Shiprock, NM	AMI/AMR Water Meter change out	1,000,000				450,000	1,450,000	1,526,678
4	Trans & Distr	Regulatory	2011	Shiprock, NM	Install Backflow protection on the office building	1,800	1,200	150	100	1,463	4,713	4,962
5	Treatment	Regulatory	2011	Crownpoint, NM-Torreon Tinian Tank	Bleach Chlorinator- C-series LMI pumps- with 55 gal bleach	850	500	200	100	743	2,393	2,519
6	Treatment	Regulatory	2012	Crownpoint, NM-Breadsprings	Bleach Chlorinator- C-series LMI pumps- with 55 gal bleach	850	500	200	100	743	2,393	2,585
7	Treatment	Regulatory	2012	Crownpoint, NM-Thoreao	Gas Chlorinator- S10 -K W/150 lbs gas chlorinator	3,300	1,000	500	200	2,250	7,250	7,832
8	Trans & Distr	Regulatory	2013	Shiprock, NM	Air Gap installation at wastewater plant	32,400	6,000	1,750	541	18,311	59,002	65,407
9	Trans & Distr	Regulatory	2014	Shiprock, NM	Air Gap installation at wastewater liftstation	1,800	1,200	150	100	1,463	4,713	5,361
10										-	-	-
11										-	-	-
12										-	-	-
13										-	-	-
14										-	-	-
15										-	-	-
16										-	-	-
17										-	-	-
18										-	-	-
19										-	-	-
20										-	-	-
21										-	-	-
22										-	-	-
23										-	-	-
24										-	-	-
25										-	-	-
26										-	-	-
27										-	-	-
28										-	-	-
29										-	-	-
30										-	-	-
31										-	-	-
32										-	-	-
33										-	-	-
34										-	-	-
35										-	-	-
36										-	-	-
37										-	-	-
38										-	-	-
39										-	-	-
40										-	-	-
41										-	-	-
42										-	-	-
43										-	-	-
44										-	-	-
45										-	-	-
46										-	-	-
47										-	-	-
48										-	-	-
49										-	-	-

Date Printed: 10/26/2011

50											-	-	-
					TOTAL	2,292,900	75,300	32,150	36,181	1,096,441	3,532,972	3,716,716

Water Capital Improvement Plan: Years 2010 - 2014

HQ-Well Ops

District:

						Use 2009 Cost Estimations						
	Category	Prioritization	Year of Construction	Project Location	Description	Material Cost	Labor Cost	Equipment Cost	Miscellaneous Cost	A&G Overhead	2009 Construction Cost	Cost by Year of Construction
1	Supply	Reliability	2011	Crystal, NM	Install new well with casing/ pump/ prefab building/arch clearance and permits	121,275.00	161,700.00	80,850.00	40,425.00	181,913	586,163	617,160
2	Supply	Reliability	2011	Twin Lakes	Install new well with casing/ pump/ prefab building/arch clearance and permits	95,287.50	127,050.00	63,525.00	31,762.50	142,931	460,556	484,911
3	Supply	Reliability	2012	Sanostee	Install new well with casing/ pump/ prefab building/arch clearance and permits	147,262.50	196,350.00	98,175.00	49,087.50	220,894	711,769	768,968
4	Supply	Reliability	2012	Church Rock	Install new well with casing/ pump/ prefab building/arch clearance and permits	86,625.00	115,500.00	57,750.00	28,875.00	129,938	418,688	452,335
5	Supply	Reliability	2013	Iyanbito	Install new well with casing/ pump/ prefab building/arch clearance and permits	147,262.50	196,350.00	98,175.00	49,087.50	220,894	711,769	789,038
6	Supply	Reliability	2013	Red Rock	Install new well with casing/ pump/ prefab building/arch clearance and permits	118,282.50	157,710.00	78,855.00	39,427.50	177,424	571,699	633,761
7	Supply	Reliability	2014	Casamero lake	Install new well with casing/ pump/ prefab building/arch clearance and permits	129,937.50	173,250.00	86,625.00	43,312.50	194,906	628,031	714,380
8										-	-	-
9										-	-	-
10										-	-	-
11										-	-	-
12										-	-	-
13										-	-	-
14										-	-	-
15										-	-	-
16										-	-	-
17										-	-	-
18										-	-	-
19										-	-	-
20										-	-	-
28										-	-	-
29										-	-	-
30										-	-	-
31										-	-	-
32										-	-	-
33										-	-	-
34										-	-	-
35										-	-	-
36										-	-	-
37										-	-	-
38										-	-	-
39										-	-	-
40										-	-	-
41										-	-	-
42										-	-	-
43										-	-	-
44										-	-	-
45										-	-	-
46										-	-	-
47										-	-	-
48										-	-	-
49										-	-	-
50										-	-	-
					TOTAL	845,933	1,127,910	563,955	281,978	1,268,900	4,088,675	4,460,553

Date Printed: 10/26/2011

Water Capital Improvement Plan: Years 2010 - 2014

Water Treatment

District:

						Use 2009 Cost Estimations						
	Category	Prioritization	Year of Construction	Project Location	Description	Material Cost	Labor Cost	Equipment Cost	Miscellaneous Cost	A&G Overhead	2009 Construction Cost	Cost by Year of Construction
1	Treatment	Regulatory	2010	Toadlena, NM	Installation of a packaged filtration system at the Toadlena North (12-0766) tribal well pump house to remove high levels of arsenic.	250,000	50,000	10,000	2,000	140,400	452,400	464,208
2	Treatment	Regulatory	2010	Newcomb, NM	Installation of a packaged filtration system at both, the Newcomb # 1 (12T-618) and Newcomb # 2 (12T-587) tribal well pump houses, to remove high natural levels of fluoride.	180,000	30,000	6,000	1,000	97,650	314,650	322,862
3	Treatment	Regulatory	2011	Nageezi, NM	Installation of a packaged filtration system at the chemical building for the Nageezi # 1 (19T-510) and Nageezi # 2 (19T-525A) tribal wells to remove high levels of iron and manganese.	350,000	80,000	12,000	2,000	199,800	643,800	677,845
4	Treatment	Regulatory	2011	Casamero Lake, NM	Installation of a packaged filtration system at the Casamero Lake # 1 (16T-588) tribal well pump house to remove high levels of uranium, iron, and manganese.	400,000	90,000	13,000	2,000	227,250	732,250	770,973
5	Treatment	Regulatory	2012	Smith Lake, NM	Installation of a packaged filtration system at both, the Smith Lake # 1 (16T-594) and Smith Lake # 2 (16T-597) tribal well pump houses, to remove iron, manganese, and hydrogen sulfide.	380,000	85,000	12,000	2,000	215,550	694,550	750,365
6	Treatment	Regulatory	2012	Iyanbito, NM	Installation of a packaged filtration system at both, the Iyanbito # 1 (16T-668) and Iyanbito # 2 (16T-666) tribal well pump houses, to high levels of remove iron and manganese.	400,000	90,000	13,000	2,000	227,250	732,250	791,095
7	Treatment	Regulatory	2013	Lake Valley, NM	Installation of a packaged filtration system at the chemical building for the Lake Valley # 1 (15T-565) and Lake Valley # 2 (15T-565A) tribal wells to remove high levels of iron and manganese.	400,000	90,000	13,000	20,000	235,350	758,350	840,677
8										-	-	-
9										-	-	-
10										-	-	-
11										-	-	-
12										-	-	-
13										-	-	-
14										-	-	-
15										-	-	-
16										-	-	-
17										-	-	-
18										-	-	-
19										-	-	-
20										-	-	-
21										-	-	-
22										-	-	-
23										-	-	-
24										-	-	-
25										-	-	-
26										-	-	-
27										-	-	-
28										-	-	-
29										-	-	-
30										-	-	-
31										-	-	-
32										-	-	-
33										-	-	-
34										-	-	-
					TOTAL	2,360,000	515,000	79,000	31,000	1,343,250	4,328,250	4,618,025

Date Printed: 10/26/2011

Attachment D

Conjunctive Use Buildout Projects

Priority	Project Type	Title	Scope	SDS #	Comments
1	Intertie	Tsayatoh/North Manuelito Intertie	2 miles 10" PVC		N94 drilling new well
2	Production	Thoreau	1,708 ft well		Alternative 1
	Intertie	Haystack/Baca Intertie	6 miles 10 PVC		Alternative 2
	Intertie	Iyanbito/Thoreau Intertie	9 miles 10" PVC		Alternative 3
3	Pipeline Upgrade	Mariano Lake to Churchrock	12 miles 10" PVC		Phase 1
4	Intertie	Churchrock/Iyanbito Intertie	2 miles 10" PVC		Phase 2
5	Intertie	Standing Rock/Nahodish Intertie	2 miles 10" PVC		Phase 1
6	Intertie	Coyote Canyon/Standing Rock	3.5 miles 10" PVC		Phase 2
7	Pipeline Upgrade	Twin Lakes to Crownpoint	43 miles 10" PVC		Phase 3
8	Production	Crownpoint	2,375 ft well		Alternative: NGWSP from Twin Lakes
9	Intertie	Manuelito/Jones Ranch Intertie (has ROW)	2 miles 10" PVC		Phase 1
10	Booster	Manuelito/Jones Ranch Booster	Booster to Chichiltah		Phase 2
	Intertie	Sheepsprings/Naschitti Intertie	2 miles 10" PVC		Needed - Jim?
	Intertie	Littlewater/Casamero Lake Intertie	2 miles 10" PVC/booster/tank		

Intertie	Casamero Lake/Thoreau	1 miles 10" PVC	
Pipeline Upgrade	Churchrock to Hardground	2 miles 10" PVC	
Pipeline Upgrade	Mariano Lake to Casamero Lake	15 miles 10" PVC	
Capacity Upgrade	China Springs	?	
Capacity Upgrade	Juniper Hills	?	
Production	Littlewater	2,605 ft well	Alternative: NGWSP from Twin Lakes
Production	Twin Lakes	3,500-ft well	Alternative: NGWSP from Twin Lakes
Production	Casamero Lake	2,550 ft well	Alternative: NGWSP from Twin Lakes
Storage??	Unassessed - Jayne?		

((Insert into Attachment E) Some existing wells produce water with elevated arsenic levels. Construction of system interties to allow blending of supplies to meet water quality standards should be considered (eg. Toadlena wells contain arsenic in concentrations above the newly established MCL of 10 ppb. NTUA has selected the arsenic compliance methodology of blending instead of treatment due to operational cost and complexity associated with operating arsenic treatment plants. The

Naschitti Community Water System (CWS) source has no water quality issues and sufficient capacity to provide water to the Toadlena CWS via the Sheep Springs CWS for blending.(pers. com. Magnuson, Jim P. (IHS/NAV) 15 Jan 2010)).)

ATTACHMENT E
DRAFT – March 30, 2010
NAVAJO GALLUP WATER SUPPLY PROJECT
CONJUNCTIVE GROUNDWATER PROJECT COORDINATION COMMITTEE (CGPCC)
CHARTER

As identified in the Omnibus Act (PL111-11), the Department of the Interior has authority to design and construct the conjunctive groundwater component of the Navajo Gallup Water Supply Project (Project). The Secretary has designated the U.S. Bureau of Indian Affairs (BIA) as the lead federal agency. The Navajo Nation anticipates that this work will be implemented through a P.L. 638 (Subpart J) construction contract. This document describes the principles of business necessary to implement this responsibility and enhance communication among the members of the Conjunctive Groundwater Project Coordination Committee (CGPCC).

A. OBJECTIVES:

1. Work together with the common goals of selection, design and construction of the groundwater infrastructure authorized by PL 111-11 in a safe, functional and cost effective manner.

2. Provide a mechanism for consultation aimed towards completion of the groundwater infrastructure projects in a timely and transparent fashion.

3. Provide for accountability by:
   a. Conferring on key decisions
   b. Controlling spending
   c. Consulting on BIA/Tribe contractual relationships
   d. Project schedule and implementation
   e. Effective budgetary planning and expenditures

4. Track costs and estimated costs against baseline estimates.

5. Avoid delays to "time critical" actions.

6. Work issues to their end, at the lowest level possible.

7. Work together – Resolve issues within the CGPCC and not in public.

B. MEMBERSHIP: (DETERMINATION OF REPRESENTATIVES ARE THE REPSONSIBILTIY OF THE RESPECTIVE AGENCY)

1. Navajo Nation Department of Water Resources (NNDWR).

2. The U.S. Bureau of Indian Affairs (BIA).

3. The Navajo Tribal Utility Authority (NTUA).

4. The Indian Health Service (IHS).

5. The U.S. Bureau of Reclamation (Reclamation).

C. PROCEDURES:

1. BIA and NNDWR will alternate in the distribution of quarterly reports to CGPCC. Reports include:
   a) Schedule
   b) Progress updates
   c) Updated estimates and actual expenditures
   d) Current FY budgets (Activity Plans)
   e) Out year Activity Plans (which will be updated annually)

2. Coordination and consultation among the full CGPCC. Consultation among the members includes:

   a) Explanation of issues and how those issues are estimated to impact the cost and schedule including reasonable alternatives.
   b) Identify timelines for decision points
   c) Allow for input from all CGPCC members
   d) Attempt to achieve consensus to make decisions.

3. Consultation includes:

   a) Meetings (Interval will be quarterly or as determined by CGPCC)
   b) Project Issue Notifications (PIN)
   c) Where a PIN is not appropriate issues will be described in letters

4. BIA and NNDWR will alternate chairing meetings, and will develop and distribute agendas for CGPCC meetings one week ahead of time. (Identification of agenda items by members is necessary in advance.)

5. Issues identified, by individual or collective CGPCC members, will be tracked and action plans drafted to resolve the issues.

6. The CGPCC will evaluate possible infrastructure projects by weighting the following:

a) NTUA operational data reflected in the recent NNDWR analysis
b) Integration with the IHS Sanitation Deficiency System list
c) NTUA CIP priorities
d) Ground water demands reflected in the NNDWR NGWSP Technical Memorandum dated July 1999
e) Ground water infrastructure that integrates with the NGWSP infrastructure

7. Guest Presentations may be used to assist in understanding issues.

D. ISSUE RESOLUTION

1. The members will strive to attain a common understanding and consensus through the design and consultation process on matters related to project plans, the overall costs of the project, the reimbursable costs of the project, and on matters effecting the schedule and priorities of project construction. If consensus cannot be obtained, issues will be resolved consistent with the P.L. 638 contract provisions if applicable.

2. Each organization will designate two representatives to effectively participate in the CGPCC.

3. Should any member not agree with an issue resolution by the CGPCC, they may inform SJR Implementation Team.

E. PUBLIC'S ROLE

1. The CGPCC meetings will be open to the public if they choose to attend

2. A closed session will be called, if appropriate. Such sessions will be conducted in accordance with applicable rules.

3. Meetings among staff in preparation for CGPCC meetings will be in private.

The members agree to strive to maintain this process in good faith to successfully coordinate design and construction the NGWSP conjunctive groundwater infrastructure through completion. It is critical that each entity designates (in writing by June 1, 2010) two Principal representatives to assure effective communication and representation is achieved. The following lists those entities which are considered represented in conducting the business of the CGPCC under this Charter.

The Navajo Nation (Department of Water Resources)

The Navajo Nation (Navajo Tribal Utility Authority)

Indian Health Service

The Bureau of Indian Affairs

The Bureau of Reclamation