

Table of Contents

1.0	OBJECTIVES	1
2.0	INTRODUCTION	2
2.1	The Navajo Nation Background	3
2.2	The City of Gallup Background	7
2.3	The Navajo Agricultural Products Industry	7
3.0	PROJECT HISTORY	8
	1958 - Congressional hearings on the Navajo Indian Irrigation Project	8
	1962 - Authorization of the Navajo Indian Irrigation Project	8
	1967 - Temporary water allocation from Navajo Reservoir	9
	1971 - Congressional authorization for feasibility studies	9
	1976 - The Turney Report assessing the Navajo Nation's water needs	9
	1984 - Compliance with the National Environmental Protection Act	10
	1986 - Reclamation's Gallup-Navajo Technical Report	12
	1991 - The City of Gallup's Forty Year Water Supply Master Plan	13
	1993 - Reclamation appraisal level evaluation and cost estimate	14
	1996 - Reclamation evaluates the water supply and storage options	15
	1998 - The Memorandum of Understanding between the City and the Navajo Nation	16
	1999 - Resolutions of the Upper Colorado River Commission	16
	1990 to 1999 - Interdisciplinary technical reports	17
	1999 - San Juan River Recovery Implementation Program Flow Recommendations	21
	2000 - Investigation of the City of Gallup Transmission and Storage Facilities	22
	2001 - A technical summary and plan of approach for the Project	22
4.0	WATER DEMAND IN THE PROJECT SERVICE AREA	24
4.1	Current population	24
4.3	Average daily per capita water use	30
4.4	Seasonal and daily peak per capita water use	34
4.5	NAPI's water demand for future projects	36
5.0	WATER PRODUCTION IN THE SERVICE AREA	38
5.1	Groundwater production for the City of Gallup	41
5.2	Groundwater production for the Navajo Nation	42
5.2.1	Central Project Chapters Subarea	42
5.2.2	Crownpoint Subarea	42
5.2.3	Gallup Area	43
5.2.4	Huerfano Subarea	43
5.2.5	Rock Springs Subarea	43
5.2.6	Route 666 Chapters	44
5.2.7	San Juan River Subarea	45
5.2.8	Torreon Subarea	46
5.2.9	NAPI	46
5.2.10	Window Rock Subarea	46

5.2.11	Thoreau - Smith Lake Subarea	47
6.0	NON-STRUCTURAL ALTERNATIVES	48
6.1	Water Conservation	48
6.1.1	Public education programs	48
6.1.2	Incentive programs	48
6.1.3	Regulatory programs	50
6.2	Water Reuse	50
6.3	Conjunctive use of groundwater and aquifer storage	51
6.3.1	Utilize wells for peak summer demand	51
6.3.2	Supplemental groundwater during critical years	52
6.3.3	Aquifer storage and recovery	52
7.0	SURFACE WATER SUPPLY OPTIONS	54
7.1	Acquisition of private water rights or water options	54
7.2	A San Juan River water contract with the Department of the Interior	55
7.3	Contract water from the Jicarilla Apache Nation	57
7.4	Navajo Indian Irrigation Project water	58
7.5	Navajo non-NIIP water	61
7.6	Central Arizona Project or other Main-stem Colorado River water	62
7.7	Conclusions	62
8.0	NAVAJO-GALLUP PROJECT STRUCTURAL ALTERNATIVES	64
8.1	The San Juan River Diversion Alternative	67
8.1.1	Potential San Juan River Points of Diversion	67
8.1.2	The Highway 666 Pipeline Corridor	75
8.2	The NIIP Alternative	78
8.2.1	Conveying water through the NIIP Facilities	78
8.2.2	The Transwestern Pipeline Corridor	88
8.2.3	Pumping Requirements	88
8.3	Service to the Municipal Subareas	90
8.3.1	City of Gallup	95
8.3.2	Central Project Subarea	96
8.3.3	Crownpoint Subarea	97
8.3.4	Gallup Area (Navajo Land Adjacent to the City of Gallup)	98
8.3.5	Huerfano Subarea	100
8.3.6	Rock Springs Subarea	101
8.3.7	Route 666 Subarea	102
8.3.8	San Juan River Subarea	103
8.3.9	Torreon Subarea	104
8.3.10	NAPI Subarea	105
8.3.11	Window Rock Subarea	105
8.3.12	Thoreau-Smith Lake Subarea	106
8.4	Power transmission lines, SCADA systems, and cathodic protection	108
8.5	Water treatment	108
8.5.1	Conventional Water Treatment Systems	113
8.5.2	Microfiltration Treatment Systems	116

	8.5.3	Diatomaceous Earth Water Treatment Systems	116
8.6		Wastewater treatment	118
8.7		Terminus storage	118
8.8		Project rights-of-way	120
8.9		Other direct and indirect costs	123
8.10		Summary of the capital costs	125
8.11		Summary of the Project's operation and maintenance	128
9.0		THE UNIT COST OF PROJECT WATER	130
9.1		Amortized capital costs	130
9.2		Colorado River Storage Project fees	131
9.3		Acquiring water rights	131
9.4		NIIP Cost of Services and Potential Repayment Obligation	132
9.5		The City of Gallup and NTUA municipal system improvements	133
9.6		City of Gallup and NTUA retail costs	134
9.7		Project operation and maintenance	134
9.8		Phasing and conjunctive use	135
9.9		Conclusion of the Unit Cost Analysis	136
10.0		PLAN OF APPROACH AND PROJECT TIME LINE	137