

1,197,000
 1,197,000
 84100
 090000
 XXXXXX 6100
 090000
 Development of Spring Water Supply for Garden Canyons DFW

NO.	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	DATE	STATUS
1	PIPE LINES	LP	85,745	6.41	550		
2	CONCRETE	CY	34,200	3.00	103		
3	REINFORCED PIPE (GALLERIES)	EA	12,700	18.00	229		
4	CHLORINATION SYSTEM	EA	19	475.00	9		
5	PAINTING PIPE LINES	LF	2,300	15.00	65		
6	WELL DRILLING 3'-8" & 1'-24"	EA	1	175	15		
7	700 GPM WELL PUMP	EA	4	34,000	138		
8	700 GPM CLEAR WELL & BOOSTER	EA	1	1,600	16		
9	US GEOLOGICAL SURVEY SUPPLY	JOB	1	1,197	30		

RECOMMENDATION FOR THE PROJECT: This item is required to provide additional water for domestic use as well as to reduce the amount of water withdrawn from the diminishing underground water basin. Water used at this installation as well as surrounding communities is supplied from the same underground basin at a depth of some 475 feet. A continuous lowering (18 feet since 1950) of the static level of this basin has become a problem of grave concern to this installation. The demand for water on the installation as well as surrounding communities has increased over the past 8 years from approximately 1,140,000 gallons per day to 6,500,000 gallons per day.

This project proposes to supplement the existing post water system by utilizing to every extent possible, the water supply afforded by the springs in Machuca and Garden Canyons as recommended by the US Geological Survey. Ground Water Branch and concurred in by this command. The method of utilization herein proposed will reduce pumping during the summer months and eliminate pumping completely during the winter season. This project is designed to replenish the underground supply and will stabilize the water table by replacing withdrawals faster than will occur in the natural recharge.

UNITED STATES DEPARTMENT OF AGRICULTURE
 OFFICE OF WATER RESOURCES
 WASHINGTON, D. C. 20250

UNITED STATES DEPARTMENT OF AGRICULTURE
 OFFICE OF WATER RESOURCES
 WASHINGTON, D. C. 20250

UNITED STATES DEPARTMENT OF AGRICULTURE
 OFFICE OF WATER RESOURCES
 WASHINGTON, D. C. 20250

1. General:
 The water supply system first accommodated an average 24-hour population of 12,000. The peak water consumption which occurs during the months of March through June exceeds 4,000,000 gallons per day. The following is a tabulation of the water consumption in gallons during the past nine (10) years:

Year	Average Day	Maximum Day	Year Total
1956	1,226,000	2,622,000	447,005,000
1957	1,524,000	3,207,000	556,121,000
1958	1,874,000	3,460,000	683,968,000
1959	2,055,000	3,540,000	750,228,000
1960	2,290,000	4,205,000	802,806,000
1961	2,250,000	3,990,000	821,217,000
1962	2,476,000	4,461,000	903,730,000
1963	2,187,000	4,416,000	798,217,000
1964	2,115,000	4,020,000	771,053,000
1965	2,530,000	3,580,000	912,366,000

This project will produce, water for domestic use, in excess of 350,000,000 gallons per year, (average flow) of which it is estimated 250,000,000 gallons can be utilized directly to provide a portion of the peak domestic water supply. Since the cost of producing water at this installation is 14 cents per thousand gallons, a savings of some \$35,000,000 per year would result, however the principal consideration is the saving to the Government but in the conservation of a critical natural resource which is being depleted. This depletion is evident by the lowering of the underground water table, at the same time, as verified by the US Geological Survey, (records show a decrease of 2.4 feet per year. Furthermore, the depletion of this resource is continually increasing as more and more water is drilled adjacent to this installation by the Cities of Sierra Vista and Fry.

2. Data on Accommodations now in Use:

The existing water system consists of six deep wells with clear wells, booster pumps and storage capacity of 5,439,000 gallons, which is made up of one 500,000 gallon elevated steel tank, one 3,000,000 gallon concrete ground level reservoir, one 1,500,000 gallon concrete reservoir and the two old masonry reservoirs in the rain post area with a combined capacity of 450,000 gallons. There also exist two booster stations, one in the Wherry Housing Area which delivers water to the 1,500,000 gallon reservoir and one at the base of this reservoir which delivers water to the 450,000 gallon masonry reservoirs on the ridge above the main post. This system of wells and well booster pumps is capable of maximum production of approximately 4,200,000 gallons per day with all wells and booster pumps operating on a full 24-hour schedule. (See Supplemental Data Sheets for detail description of existing system).

This proposed project will augment the water producing capability of the existing system which is presently utilized to its maximum limit during peak water consumption. Under present conditions the existing system is capable of producing 4,200,000 gallons per day as compared to a peak consumption of 4,461,000 gallons per day. The excess consumption over the productive capabilities, some 300,000 gallons, is supplied from in-storage facilities. It is quite obvious if this maximum day consumption extends over a period of several days the in-storage facilities could be depleted to the extent of jeopardizing the installations fire fighting capabilities.

3. Analysis of Deficiency:

Records maintained by the US Geological Survey as well as data on file at this installation indicate that the underground water table in the existing well field has declined an average of 18 feet during the period of 1954 to 1962 on an average of 2.4 feet per year. This rate of decline in the water table has not been a uniform 2.4 feet per year but rather is in proportion to the water withdrawn by pumping from the aquifer. The ever increasing demands on this underground water basin created by heavy water usage at this installation (as indicated under General paragraph above) as well as the ever increasing demand in adjacent well fields in surrounding communities (Sierra Vista consumes at present 1,400,000 Gallons per day) results in an ever increasing rate of decline in the water level. This depletion is consistently demanding upon a steadily decreasing water supply. The inevitable result will be a complete depletion of a critical natural resource.

133000

Development of Spring Water Supply in
Huachuca and Garden Canyons DDF

DISSEMINATION OF POST WARRIOR SUPPLY

SUPPLEMENTAL DATA

Fort Huachuca

1. The original Army Post at the base of the Huachuca Mountains was established in March 1877. The water supply was obtained from springs in Huachuca Canyon for a period of almost thirty-four years.

In 1911, a collecting works was constructed near the junction of Garden and McClure Canyons with small pipe lines up the canyons to several springs and an eight inch steel pipeline seven miles long was constructed from the collecting box to a 250,000 gallon masonry storage reservoir. During the same year, investigations were started, and considerable money was expended in prospecting for additional water supplies. A number of test holes were drilled near the mouth of Garden and Huachuca Canyons to depths up to 1,000 feet without any great measure of success. As a result of this exploration, an 8 inch well was developed in Garden Canyon which was capable of delivering 35 gallons per minute using an air lift pump. This supply was used to augment the spring flow in times of drought. (This well is no longer in use due to small capacity and remote location). In the years between 1919 and 1936, concrete inlet boxes, dams, and catch basins were constructed in the canyons to utilize all available spring flow. This work, however was undertaken by the inexperienced Post personnel, and results were not satisfactory.

2. In 1936, the water problem again became acute, and in that year a six inch diameter well was drilled 290 feet west of the Main Gate (Well No. 1) and is abandoned). This well was capable of producing 100 gallons per minute and was equipped with a plunger type pump in September 1938. This new source was further developed in January 1939, when a fourteen inch diameter well was drilled 250 feet west of the Main Gate (Well No. 1), which has been in service since and is supplying 550 gallons per minute to the Old Post reservoir.

3. In 1940, further development was carried on with the drilling of a second fourteen inch diameter well 900 feet west of the Main Gate (Well No. 2), which has been in service approximately 21 years and is supplying 730 gallons per minute to the Old Post reservoirs.

4. In 1941, during the initial development of mobilization training facilities at Fort Huachuca, one 500,000 gallon elevated steel storage tank was erected on the north side of Railroad Avenue and connected into the Post water system.

5. In 1942, with the mobilization for World War II, Wells No. 3, 4 and 5 were drilled, each having a capacity of approximately 700 gallons per minute and a three million gallon ground storage reservoir, as well as another 500,000 gallon steel tank were constructed. This, together with the installation of distribution and supply mains, were constructed to support some 42,500 population with a maximum daily consumption of 3,900,000 gallons.

6. In 1956, a 1,500 gallon per minute booster station was installed in support of 500 units of Merry family housing. This booster station consisted of three 500 gallon per minute pumps taking suction from the 3 million gallon reservoir and discharging into a 10,000 gallon pressure tank, which fed into the Merry Housing distribution system.

7. In 1958, a 1 1/2 million gallon concrete ground reservoir was constructed at an intermediate elevation between the three million gallon reservoir and the 450,000 gallon reservoirs. This reservoir was constructed to provide additional storage in support of 575 units of Capehart Housing as well as RCA construction projects. The 10,000 gallon pressure tank which serviced the Merry Housing Project was removed from the system and the three 500 gallon per minute pumps discharged into the new 1 1/2 million gallon reservoir as well as into the distribution system.

8. In 1958, Well No. 6 was drilled to a depth of 1,312 feet. This well was then developed and tested under the supervision of the Ground Water Branch of the Geological Survey Department of Interior and is capable of producing 750 gallons per minute over a sustained period of years.

9. In 1960, pumping equipment is installed in Well No. 5 and connected into the system. This well is capable of delivering 700 gallons per minute discharging into a 50,000 gallon concrete storage

030000

Development of Spring Water Supply in
Henderson and Garden Counties
DNR

Port Henderson

SUPPLEMENTAL DATA (Continued)

tank from which a 750 gallon per minute booster pump takes suction
 and discharges through supply mains into the 3 million gallon
 reservoir.
 10. In 1961, a booster pumping station consisting of three 500
 gallon per minute pumps was installed at the base of the 1 1/2 million
 gallon reservoir. This booster station lifts water from the interme-
 diate zone (1/2 million gallon reservoir) to the high level or 450,000
 gallon reservoir. In the same year one additional booster pump,
 (500 gallon per minute) was added to the Cherry booster pumping
 station increasing capacity of the station to 2,000 gallon per minute.

