Albuquerque, N. M.
April 3, 1920.

Mr. H. F. Robinson, Supervising Engineer,
Albuquerque, N. M.

Dear Sir:

In accordance with your instructions I have made an instrumental survey of the Kin Le Chee district in order to determine the feasibility of an irrigation system in that vicinity. At first glance, it is evident that the Navajos in this valley are mainly agricultural. They are very eager to get water for their land and have built ditches, dams and flumes of a primitive nature.

Kin Le Chee is about six miles above the Ganado Storage Basin, along the Rio Pueblo Colorado, at an elevation of about 6200 feet. The climate is characteristic of that part of Arizona, having its extremes not only between different seasons, but even between day and night. The river and the arroyos have almost perpendicular banks from 30 to 40 feet deep.

The Rio Pueblo Colorado has, as a perennial stream, a flow of 5 second feet. During high floods its flow rises to several thousand second feet.

The Indians are willing to contribute their labor free. No dam or storage basin is required for this project, so the cost per acre will be very small to the Government.

Surveys have been made according to instructions and include the location of the necessary ditch lines, besides their traverses which furnish sufficient data for a topographical map, covering the irrigable area of this project. The map has been platted to a scale of 400' to the inch, and shows at a glance the needs of the Indians in this part of the Rio Pueblo Colorado Valley. The irrigable area covers about 360 acres, 80 acres being on the left (south) bank and 280 acres are on the right (north) bank. Above the irrigable area the river runs through a canyon with steep rock walls averaging 30 to 100 ft. in height.

Population and land. The Indians in this district are agricultural. I saw them do their spring plowing at the beginning of March. They take great pains to obtain water for their lands, as is evidenced by the crude dams and ditches and the wooden flumes running along the rock walls of the canyon. The rainfall is about 13 inches per year. The land is a rich sandy loam, from 40 to 60 ft. in depth. It has a gradual slope from the ditch lines to the

river banks. It is fairly smooth and the Indians have little trouble to level and clear it. It has been extensively used for sheep pasture and is covered with a great amount of droppings, which will dissolve and fertilize the soil as soon as irrigation is started.

The size of the ditches will be as large as a small scraper can make. With a depth of 2 ft. This will have a capacity of 5 second feet at the headgate, which will be sufficient for years to come.

Structures. They only structures needed are three 200-ft. flumes and drops as per table:

Station	Length	Number R.Hardesty Catlg.	Capacity in sec.ft.	Diameter in inches	Cost	
32 Main Ditch	200 Ft.	#42	5.85	26.75	$1600	Including piers, trusses
76 " "	200 Ft.	#36	3.83	22.9	1600	" "
17 Branch	200 Ft.	#24	1.24	15.3	1200	" "
					$4400	

Headgate will consist of 2 - 10 ft. lengths of 36" flat bottomed corrugated iron pipes and #251 Union headgate 6' high 36" diameter (R. Hardesty Catalogue. Page 68).
It will require 20 sacks of cement for installation.

Cost of headgate:

20' pipe @ $2.80 -	$56.00
20 sacks cement	60.00
#251 Gate	160.00
	$276.00

The drops will be of the Zuni type and as the Indians furnish labor free, only the cost of cement is taken into account.

Drops on Main Ditch:

Station	Height	Cost.
92	9'	$ 90
97	2'	20
99	4'	40
107	4'	40
113	5'	50
120	5'	50
129	6'	60
133	2'	20
135	2'	20
141	3'	30
142	5'	50

Drops on Branch Ditch:

14	8'	80
48	9'	90
51	7'	70
57	4'	40
63	3'	30
82	2'	20

Total..... $ 800.00

There will be 4¾ miles of ditches, but since they will be built with teams and scrapers and the Indians have agreed to furnish the labor free, the only cost will be superintendence, including surveys (leverls and slopestakes).

No laterals are figured in this report. The Indians will dig them as they need them in time to come and will build their headgates for them, at their own expense.

The flume sites on this project are located so as to have one end of the flume on a rocky bank with rock foundations for part of its piers. The other end of the flume will have to have cribwork for protection of its piers and the bank.

Flume #42 at Station 32 will be 13' above rock bottom and should have a deck truss 50 ft. long of the same type as the 70' truss at Ganado, Ariz. It will have a dead load on top of truss (not including truss) of 135# per lineal foot.

Flume #36 at Station 76 will have its grade 40 feet above the piers with a center span of 50 feet. It will have a dead load above the substructure (not including truss or substructure) of 110# per lineal foot.

Flume #24 at Station 14 of the branch line will have its grade 40 ft. above the piers with a center span of 50 ft. It will have a deadload above the truss, of 55# per lineal foot (weight of water, flume and flatboard)

T O T A L C O S T.

Headgate	$ 276
Flumes	4400
Drops	800
Superintendence and incidental	800
Total.....	$6276.00

Cost per acre irrigated - $\frac{\$\ 6276.00}{360}$ - $17.43 per acre.

Respectfully yours,

(signed) Philip Flitman

Supt. of Construction