

Albuquerque, N. M.

June 6, 1918.

Mr. H. F. Robinson,
 Superintendent of Irrigation,
 Albuquerque, N. M.

Dear Sir:

Following is my report upon a scheme for protecting the corn
 the Hopi Indians west of the First Mesa of the Hopi (Mequi) Reserve.



The land is situated on an alluvial flat about three miles long and from a half mile to one and one half miles wide. High winds sweep over it a greater part of the year, carrying with them quantities of fine sand. This sand drifts where conditions are favorable, forming a mulch which helps to retain what little moisture there is in the soil. Occasional torrential rain storms come down upon the land and the valley above, and on account of the fact that sheep feed about the country, there is no vegetation to hold the water and the storm waters run off very rapidly. The fact that the land is even and has a gentle slope has prevented the formation of arroyos. Of late, however, several small gullies have formed, which will gradually work back towards the head of the valley and prevent the spreading of rain waters and render the lands useless, or nearly so, for cultivation. A plan to stop the further formation of gullies, spread the water evenly and conserve it; give the land greater productiveness and save the Indians from the dreaded famines which have been their terror in times past, ought to be adopted and carried out.

With that object in view, upon your direction I visited the place in company with Mr. A. H. Womack, to whom credit for many of the ideas of the proposed plan is due.

Accompanying this report is a sketch made from rough drawings of the

ground. There was not enough time at our disposal to make a survey. While not accurate, the sketch will give a fair idea of the topography and of the plan proposed to handle the flood waters. It will be noticed that the land has a gentle slope to the south. At the south end appear several small gullies mentioned above. These are evidently of recent origin, as they cut directly across cornfields having the stubble still standing in the hills. Two dikes are shown in solid black lines. These are artificial, but when built I did not learn. They are about six feet high and twenty feet wide at the bottom. Unfortunately they are not so located as to prevent the rapid flow of the waters. They can be used, however, in the proposed plan.

The plan is briefly this: Dikes are to be built running from each of the above mentioned dikes at such an angle as the slope of the ground requires to give the water a low velocity. Should the amount of the flow be such that the determined velocity will not carry all the water, part will overflow the cross dike, and the balance will be diverted around its end. This will happen at each succeeding dike and continue until the force of the flood has been spent, and the overflow will run off down the valley beyond the cultivated land. The existing dikes should be extended at the upper end to a point to be determined by careful survey. The water-course is wide, so that in time of flood the first dike will divert part of the flow, the second dike a part, and the third the balance. This third dike does not exist, so is shown in dotted line. It need not be so large nor so long as the existing ones. Its height should be about four feet. It will serve about one-fourth of the land covered by the project, and should be built after the same manner as the cross dikes, which is proposed to be as follows:

Build a fence of woven wire, No. 12 gauge, 32 inches high, with cedar posts about four inches in diameter and set eighteen inches in the ground. Against the lower side of the fence build a bank three feet wide composed of cedar brush obtained

from the cutting of the fence posts, and also brush which grows in the immediate vicinity. The brush is to be thoroughly mixed and compacted with earth. It is evident that the existing dikes have been gradually built wider and higher by the deposit of wind blown sand. While the proposed small dikes will have a direction not so favorable for the deposition of sand by the prevailing winds, it is probable that we can expect these to be built up in the same manner as the large dikes.

These small dikes cannot be expected to withstand the effects of a large flood, but they will serve to divert and spread the ordinary storm flows, while in time of extraordinary floods they can be relied upon to break up and spread the flow enough to prevent the cutting of gullies in the fields. They can be easily and cheaply repaired, and can be cut to permit water to be used where desired. Careful surveys must be made to determine the proper location and length of these small dikes.

Probably it will be found advisable to decrease the height of those lower down the valley. The Indians can be left to take care of the distribution of water to particular fields. The main necessity is to build the general protection scheme, and then leave particular use of the work to the respective planters.

Owing to lack of time for obtaining complete information, it is difficult to estimate the cost of the project.

Roughly, there will be required 11000 feet of small dikes. The probable cost of these will be \$0.50 per foot. The extension of the existing dikes will cost \$500.00. The third large dikes estimated at 600 feet, will cost \$500.00. Surveying, mapping and superintendence ought to cost not to exceed \$500.00. These items total \$7000.00. Add 10% for contingencies, making a total of \$7700.00.

The project will serve about 1000 acres, making the cost per acre \$7.70.

Respectfully submitted

George M. Post

Superintendent of Construction.