Reservoir
Blue Canyon.

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DEPARTMENT OF THE INTERIOR,

UNITED STATES INDIAN SERVICE,

Albuquerque, N.M. December 29, 1910.

Mr. W. H. Code,

Chief Engineer, U.S.I.S.,

Los Angeles, Calif.

Dear Sir:-

About three miles from Fort Defiance is a small canyon known as Blue Canyon, in which a small stream flows a portion of the year, and at times there is a large flood discharge. The present supply of water for irrigation of the School and Agency farm is small, and it was thought that a dam in this canyon would conserve a portion, at least, of the flood waters to augment the supply.

I therefore had a survey made, with the following results:

At the point best suited for the construction of a dam the sides of the canyon are about perpendicular, and the distance between the walls is 65 feet. Under the conditions obtaining, a dam with a maximum height of about 32 feet above the present stream bed would be about as high a dam as could be economically constructed, although one to a greater height could be built. The measurements as to the capacity of the proposed reservoir were based on that height.

The walls of the canyon are solid rock. The bottom, at the proposed dam site, is filled to an unknown depth with sand and gravel. A test pit was put down some eight feet, but owing to the presence of water could go no deeper, and no

borings were made.

There is no way to construct a spillway, with reasonable expense, and all excess of water will have to pass over the top of the dam.

Type of Dam:

It would be possible to build a solid rock or concrete dam, gravity section, of a good foundation can be found at a reasonable depth. A hollow, buttressed dam (say of the Ambursen type) would be good construction, but the cheapest type would be a log crib, rock filled dam, in four steps on the down stream side, and with a batter of 1/2 to 1 on the upper. This would give a base of about 45 feet, and a height from foundation of 40 feet (assuming that 8 feet below the present bottom would give a good bearing). The decks to be covered with 3" plank, and two rows of sheet piling driven if found necessary. Below the lower apron a large mass of loose rock to be placed.

Superintendent Paquette has offered to furnish all of the lumber needed for the work, from the Government saw mill, and to deliver it on the ground free of charge to the Irrigation Department.

The cost, without the sawed timber is estimated at $6000.

The capacity of the reservoir would be as follows:

98'	contour	0.00 acre feet
100'	"	0.07 " "
110'	"	11.17 " "
120'	"	47.17 " "
130'	"	144.47 " "

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On the above basis of storage capacity and cost, the cost per acre foot of the water stored, filling the reservoir once each year, would be about $41.

If the duty of the water is 2-1/2 acre feet, as I have assumed, about 58 acres would be served, if used on new land, at a cost of $104 per acre.

The silt problem must also be taken into consideration. I am informed that the water coming down this canyon, which is a branch of Canyon Bonito, carries about as much silt as the latter.

Volumetric measurements made by the writer in 1904 of the flood waters of Canyon Bonito showed that there was about 13 per cent of solids carried in the larger floods. If this applies to Blue Canyon, assuming that this amount of silt was deposited with eachfilling of the reservoir, its life would be less than eight years, or the same number of fillings.

The value of the water in this very arid region might offset the high cost of construction, but without further investigations of the silt problem, I could not recommend the construction of the reservoir.

Very respectfully,

(signed) H. F. ROBINSON,

Superintendent of Irrigation.

(HPC)

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