

Construction of the Los Angeles Aqueduct in the Vicinity of Little Lake

The idea of bringing water from the Owens River and Valley was conceived fifteen years before actual construction of the aqueduct officially began in the summer of 1908. Mr. Fred Eaton, who owned a ranch in Owens Valley, developed a plan in 1893. Mr. Eaton had been for several years Engineer and Superintendent of the Los Angeles City Water company. Later he became the City Engineer and was Mayor of Los Angeles during the years 1899-1900. Knowing there was a growing need for water in the Los Angeles area he invested \$30,000 of his own money into obtaining extensive contracts and options on water-bearing properties in the southern portion of Owens Valley. In the Fall of 1904 Mr. Eaton presented his idea to the representatives of the City of Los Angeles. His proposal was turned down at this time by the Water Commissioners. It seems Mr. Eaton wanted to hold an interest in the water proposal and the Water Commission wanted an exclusive municipal ownership.

The Board of Water Commissioners, in September 1904, sent their Superintendent, Mr. William Mulholland to investigate the water supply in Owens Valley. After carefully reviewing Mr. Mulholland's report and knowing the City's need for a more abundant water supply, the Water Commission Board accepted and signed Mr. Eaton's proposal as a contract. Since this contract would mean the purchase of many acres of land these negotiations were not made public. This was to keep the property owners from inflating the value of their land and also keep down local excitement. After the City's position became fairly secure, the news was made public.

The Reclamation Service came into Owens Valley in June of 1903 to survey and measure the streams. The people of the valley were pleased to think the Government was going to do some work here, yet nothing had been officially ordered for any work in the area other than the data collected by the surveyors. In October 1904, the Reclamation Service first heard what Los Angeles intentions were and notified Washington.

The Los Angeles Chamber of Commerce sent a delegation to Washington. Present on this trip was W. B. Mathews, the Board's attorney; and City Engineer William Mulholland. After presenting their case to President Theodore Roosevelt, the President signed a letter giving the City the water rights in Owens Valley. The letter in essence read, "to serve the necessity to the greatest good to the greatest number, required the use of the water by the City"

Later the President referred to the Congress the removal of the Reclamation Service from Owens Valley. The Act was passed as "Public Act #395", granting the City of Los Angeles all necessary right of way for canals and reservoirs for carrying of water and right of way for electric plants and transmission lines. The Act also provided for the sale of public lands and reservoir sites to the City at the rate of \$1.25 per acre. The data collected by the Reclamation Service was turned over to the city at this same time. To further help the City, President Roosevelt caused the withdrawal of a broad strip of land along the Owens River and adjacent to the intended location of the aqueduct until such time as the City could file right of way maps as required by law. The total area withdrawn was 298,000 acres. When the definite location of the aqueduct was made known the excess land was restored to public entry (*Editors note for most of the high desert area east of the Sierra's, public entry resumed about 1908.*)

Artesian public land was also bought by the City of Los Angeles, with the claim they were reservoir lands having water stored underground. After geological investigation the claim of the City was accepted by the Interior Department. Land was also bought from the Southern Pacific Railroad company at the rate of \$5.00 an acre. The Railroad owned sections of land between Freeman and the San Fernando Valley, a total of 100 miles along the proposed aqueduct site. The City purchased 1000 acres from the Southern Pacific Railroad for a total cost of \$5,000

Between the actions of the City and the Government, the people of the Owens valley got up in arms over the loss of their land and water. Much hostility prevailed during the construction of the aqueduct. Law suits were filed but the strong arm of the law prevailed.

In order for the City to fulfill their dream they would first have to appropriate the money for this tremendous undertaking. On September 5, 1905 a bond issue was voted and passed 14 to 1. The money from this bond issue was voted upon and passed 10 to 1. This was in the amount of \$23,000,000 and applied to construction work.

Work was started by hand in October, 1907 on the Elizabeth Tunnel before general construction on the aqueduct. The Elizabeth Tunnel is located in the Los Angeles area and passes through the Coast Range. It was felt the tunnel would be the controlling factor during construction of the aqueduct which did not begin until October 1, 1908. Preliminary work started in 1907 and consisted of building roads and trails, power plants, telegraph and telephone lines, and provided a water supply for the establishment of camps along the 150 miles of waterless desert.

One of the most difficult problems encountered in the construction was the supply of water for the camps. A pipe line had to be laid almost parallel to the route of the aqueduct, from start to finish, with branch lines running to side canyons. Almost every spring and creek was utilized to help fill the huge storage tanks which were installed at the camps. Roads and trails had to be built for the construction along the ridges of the mountains and from the nearest shipping points on the railroad along almost the entire length of the aqueduct route. Housing had to be provided for the men hired to work, along with offices, mess house, hospitals, warehouses and other structures such as blacksmith shops, machine shops, tunnel plants, hay barns and stables. In December 1907, bids were received for hauling of freight by teams, with the lowest bid being 28 cents a ton mile. This was for hauling the 65 mile stretch of unoccupied desert land north of Mojave.

As work progressed, the City purchased its own livestock and wagons. It organized a wagon transportation business from Mojave south to Lancaster where no railroad existed. A twelve animal team with one driver and two wagons were used to haul freight between these two points. It was later decided there would be a need for a railroad to haul supplies from Mojave through to the end of the construction work in Owens Valley, a total of 130 miles.

The City had considered building the railroad themselves, but after quite some discussion about the expense of laying rails and other expenses connected with building the railroad such as they would have to remove it after aqueduct completion, they felt it best to have a railroad corporation do the building. On April 10, 1908, a contract was signed with the Southern Pacific Company. The estimates of the job was to have it stop at Olancho, but the Southern Pacific continued on to Lone Pine and then to Owenyo where it connected with California and Nevada rails. This job was completed almost a year earlier than the contract called for. Bids were then let for hauling freight by teams and wagons from the railroad stations along the way to the construction sites.

While using teams to haul freight the City bought two traction engines developed in California and called "Caterpillar". One engine was a steamer and the other gasoline. The experimental test proved successful in a three month trial, so others were purchased making a total of 28. The engines were more economical and efficient for hauling loads than the teams were, but two things developed as the work continued. The traction engines, as they grew older, began to break down more frequently and the expense to maintain them began to grow. After an earnest effort to make a success of the engines, they were abandoned. They were removed and used where gasoline power was more desirable. The steel frames of some were used as forms for concrete work, others were sold to private parties for farming.

It was back to the teams and wagons, using from 10 to 14 teams, one driver, and hitching from two to three heavy wagons to the teams. They were able to cover 20 miles a day, and by

using the City's stock for hauling, brought the cost down to half of what the private bidders were asking.

Two of the most severe and steepest slopes along the aqueduct were at Little Lake and the Grapevine Divisions. Here, the tunnel line did not come to the surface at all, but was reached for construction through side tunnels and adits, through which material could be passed and also provide fresh air. Material for lining of the tunnels was conveyed up the mountain sides, where possible, by aerial trams.

The reservoir pertinent to Rose Valley and Little Lake area is Haiwee Reservoir, 12 miles north of Little Lake. The Reservoir is formed by two hydraulic fill dams, one at each end. Filled to the high water line it has the capacity of 20,800 million gallons. Water flowing into the reservoir from the north starts 60.8 miles from the intake on the Owens River. It enters the north dam of the reservoir traveling 7.25 miles to the south dam. The amount of water flowing into the north end is controlled by diversion and regulating gates. The maximum depth of water at the north inlet is 28 feet, with the depth at the south end dam being 64 feet. One of the most outstanding features of Haiwee Reservoir is the fact the inflow of water is completely controllable and not filled from its own watershed. When the depth is reasonably maintained the danger of short-circuiting is absolutely eliminated.

With all the power opportunities, the City was once again to benefit. The Bureau of Los Angeles Aqueduct Power in the Department of Public Works was created in September 1909. There were to be four power plants along the aqueduct. San Fernando, two at San Francisquito Canyon and one at Haiwee. The total output of the four plants would be 98,000 kilowatts with Haiwee capable of supplying 6,000 kilowatts continuously.

The following is a list of statistics for the construction of the aqueduct's beginning in 1908 and covering the five years to complete the job in May 1913.

Preliminary work, 1907 to 1908

215 miles of road.

230 miles of pipeline.

218 miles of power transmission lines.

377 miles of telegraph and telephone lines.

57 camps.

Construction work, 1908 to 1913

1,500,000 yards of concrete used.

216 miles length and sections of aqueduct.

15,000 tons of siphon steel, Pipe diameter, 7 feet 6 inches to 11 feet 6 inches. Thickness of plate, 1 4 to 1 1/8 inch.

1,355 head of livestock.

6 million pounds of blasting powder

3,900 men employed (maximum)

43 deaths resulting from accidents.

1 permanent injury

1282 slight accidents.

It is important to note for such a great accomplishment as the construction of the Los Angeles Aqueduct, fatalities were few, and only five deaths resulted from the tremendous amount of blasting powder used in the underground work. This in itself is a record.