

day, the flow in the pipe being estimated for $C = 120$, in the Chezy formula, or $n = .012$, approximately, in Kutter's formula. The finished pipe is hauled from the site of manufacture at Cooper's Cove (see Fig. 8) by an incline railway to the grade and conveyed from there by the construction railway.

The pipe is laid on crushed stone ballast. The pipe line right-of-way is 100 ft. in width, from which all trees liable to fall upon it have been removed. At every 2,000 ft. on the line is constructed an open standpipe, while all inverted siphons will have steel reinforcement and will have waste outlets at the bottoms controlled by 6-in. gate valves. Fig. 2 shows one of these siphons under con-

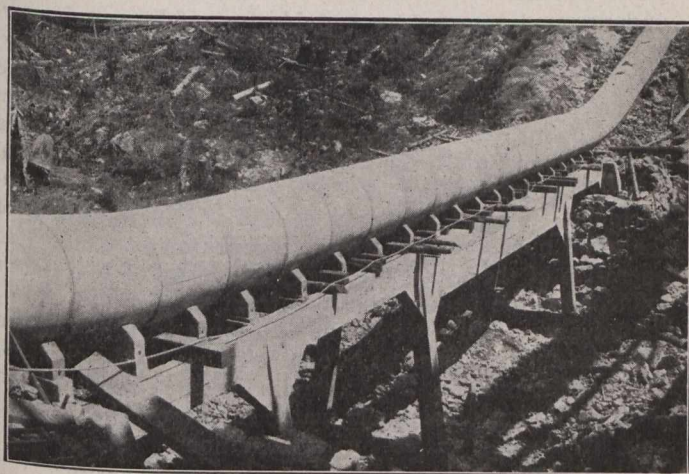


Fig. 6.—Concrete Trestle Carrying Pipe Across Gully Susceptible to Floods.

struction. There are six of them, the deepest being 600 ft. long with a maximum head of 90 ft.

In order to protect the flow line from water accumulating on either side, drainage openings of different types are being located where necessity demands along it. Usually the water will be carried along and passed under the pipe line through small holes which penetrate the ballast at points where the roadbed is in the rock. In cases where the volume of water may be considerable concrete side walls will support the pipe, if the span requires it, and also where it needs protection from scour of earthy material underneath. In cases where there is some embankment, drainage will be effected by vitrified pipe varying in diameter from 12 in. to 24 in. Where embankments are unusually large the

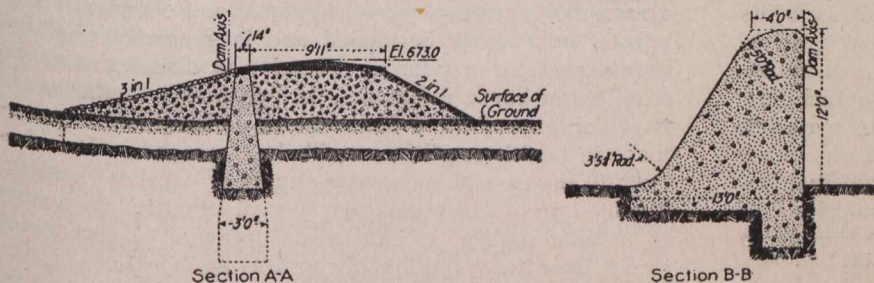


Fig. 7.—Sections of Sooke Lake Dam and Earthfill.

Pipe will be supported by open ravine culverts of about 15-ft. span. Steel bridge spans varying in length from 45 ft. to 80 ft. with concrete abutments will be used to cross transverse streams at low points of the siphons. The pipe line will not be covered except in deep cuts where protection from slides is necessary. Fig. 6 shows a section of pipe line supported by a concrete trestle.

The Humpback reservoir, the site of which is shown in Fig. 3, was decided upon after a good deal of careful investigation. The location of a reservoir at a proper level near the city formed one of the difficulties to be contended with. The reservoir site has an area of about 40 acres and was densely wooded, requiring clearing. The soil is of a black peaty nature. This has been covered with an 8-in. layer of gravel and sand. The material for this covering was procured in the immediate vicinity. The reservoir will have a capacity of 136,000,000 gal., which may be held in reserve in case any accident occur in the flow line pipe. Ordinarily the water will be delivered directly from Sooke Lake to Smith's Hill reservoir



Fig. 8.—Site of Manufacture of Pipe Sections at Cooper's Cove.

through a by-pass pipe. The latter will act as a standpipe, the pressure from Sooke Lake being too great to permit delivery directly into the city distribution system.

The dam at the Humpback reservoir has been constructed of concrete. Excavation to a depth of about 30 ft. provided a satisfactory rock foundation. The dam itself has a maximum height of 60 ft., a length of 600 ft., and contains over 8,000 cu. yds. of concrete.

From this reservoir to the city the water supply will be conveyed through a 36-in. riveted steel pipe. Cast iron outlet pipes, two in number and 34 in. in diameter have been installed at the dam for delivering the water to the pressure system. A gate house is provided with control valves, screens, etc. Waste water will be discharged from the dam through a 16-in. cast iron pipe.

The water is to be delivered from the pressure pipe line to Smith's Hill reservoir, which is situated at the southern limits of Victoria. There is a drop of 167 ft. between the two reservoirs. The riveted steel pipe line leading thereto consists of 20,500 ft. 5/16 in. in thickness and 36,500 ft. 3/8 in. in thickness. The pipe sections are about 22 ft. in length; i.e., four plate lengths. The specifications call for plate manufactured by the open-hearth process. The rivets are to be of extra soft steel, pneumatically driven, and the maximum angle of any joint must not exceed 3°. Specifications also call for a pipe coating of bitumastic, or some equally efficient preparation.

A short distance below Humpback dam a recording Venturi meter is being installed. Four concrete gate houses with 36-in. rising stem gate valves will be located along the line and 6-in. gate valves will be provided at