The Canadian Engineer

A weekly paper for Canadian civil engineers and contractors

Mechanical Filtration Plant at Lethbridge, Alberta

New Low Service Pumping Station and Relocation of Intake—Heavy Loadings Placed on Soil Capable of Bearing Scarcely Half Ton Per Square Foot When Dry and Affected Easily By Water—Filter Capacity 3,000,000 Gallons Daily

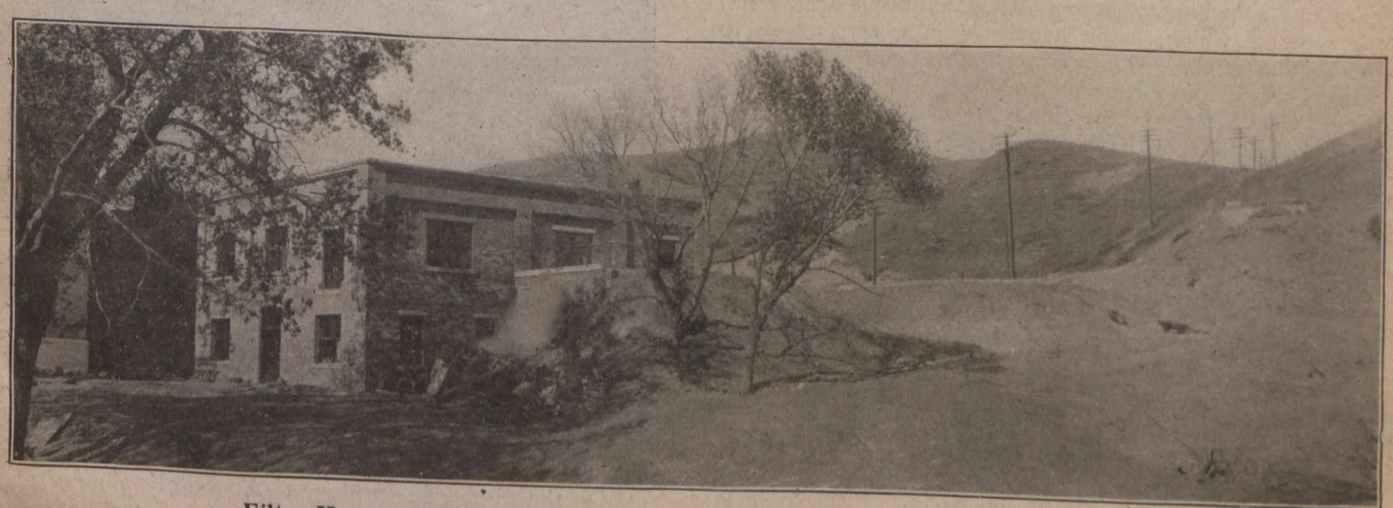
By ARTHUR M. GRACE, M. Am. Soc. C. E.
Formerly Commissioner of Public Works, Lethbridge, Alta.

IN the improvement to the Lethbridge city waterworks, now completed, not only the people of Lethbridge but all persons interested in the clean-water problem should be vitally concerned. The work involved in the present improvements comprises not only the badly needed filtration plant, but also a new low service pumping station for the filters, together with relocation of the intake for facilitating operation of the pumps at low stages of the river.

An item of special interest in connection with the work is the substantial foundation provided for the filter structures, the soil at the site being of an alluvial character, scarcely capable of safely bearing a half ton to the square foot when dry, and easily affected by water, whereas some of the loadings on the columns in the filter structures are as high as seventy-five tons, thus rendering it necessary to construct an elaborate system of sub-foundations, consisting of piling driven to hard-pan and capped with massive concrete pads, safely capable of bearing many times the final load, there being some five hundred piles used in connection with the work.

In the operation of the former plant, the intake was located at the shore line of the Old Man River, the water flowing by gravity through a thirty-inch pipe line, approximately 400 feet long, to a suction well alongside the main power house, from whence it was pumped either by a steam pump or by auxiliary electric pumps to the standpipes in the city, flowing thence through the distribution mains to the consumers. From this same suction well the condenser pumps serving the lighting and power generators also secured their supply of water; in the new improvements the supply of water necessary for the condensers is obtained directly from the low-lift pumps serving the filters, thus making operation of the condenser pumps unnecessary and effecting a considerable saving in cost of operation.

At low-water periods of the river, considerable difficulty has been experienced in the operation of the pumps, and to overcome this trouble the intake has been extended farther into the river, and also placed at a lower level, so that the water more readily flows to the pump suction well. The two new low-service pumps, one with a capacity of 3,000,000 gallons daily, and the other with a capacity of 1,500,000 gallons daily, are both placed in a pump pit or dry well, some fifteen feet deep, and located under the main filter building, both pumps being of the centrifugal type and especially designed for handling the muddy river water with a minimum amount of wear. The larger pump will be steam-operated, the engine being of the compound type, while the smaller will be electrically operated. Under normal operation only one pump will be in service, the second pump being for reserve or emergency purpose. The chamber in which the pumps are located, being much below the high or flood level of the river, is constructed throughout of concrete, heavily reinforced to withstand the earth and water pressures.



Filter House, Sedimentation Basin and Washwater Tank, Lethbridge Filter Plant