

of this pumping station is to lift the water to the prefilters, a height of approximately 18 ft., and to furnish water at a higher pressure for washing the prefilters at times of cleaning.

From the prefilters, or rapid filters, which form the first step in the purification process, the water flows by gravity to the final filters, which are quite similar in construction to slow sand filters. Passing through the final filters, the water flows into the filtered water reservoir, and is subsequently chlorinated.

From the filtered water reservoir, the water flows to the filtration pumping station, from which it is pumped to the low level pumping station, where it is forced by high

- The pumping station includes the following units:—
- 4 Raw water pumps ..... 17,500 Imp. gals. per min.
  - 2 Raw water pumps ..... 11,600 Imp. gals. per min.
  - 2 Raw water pumps ..... 5,800 Imp. gals. per min.
  - 2 Wash water pumps ..... 1,300 Imp. gals. per min.
  - 1 Sump water pump ..... 330 Imp. gals. per min.
  - 1 Sump water pump ..... 150 Imp. gals. per min.
  - 1 Three-inch hydraulic pressure pump ..... 90 lbs. pressure.
  - 1 Rotary blower ..... 5,000 cu. ft. air per min.

All of these pumps, with the exception of the 3-in. hydraulic pressure unit, were installed under the original contracts. The 3-in. pump was installed for emergencies,

TABLE SHOWING PERFORMANCE DURING PAST YEAR OF POINT ST. CHARLES FILTRATION WORKS, MONTREAL

	Average Daily Consumption			Chlorine Used P.P.M.	Turbidity			Bacteria Count				Bacterial Efficiency—Per cent.		
	Filtered Water	Raw Water	Total Water		Raw Water	Pre-filtered Water	Finally Filtered Water	Raw Water	Prefiltered Water	Finally Filtered Water	Raw and Filtered Water Mixed—After Chlorination	Pre-filters	Prefilters and Final Filters	Filtration and Chlorination of Mixed Water
1918														
July	49.3	16.1	65.4	0.22	10	5	2	530	64	25	33	87.9	95.3	93.7
Aug.	50.1	16.4	66.5	0.22	10	4	2	375	46	31	17	87.7	91.8	95.4
Sept.	50.8	14.4	65.2	0.14	10	4	2	450	49	32	9	89.1	92.9	98.0
Oct.	50.8	11.8	62.6	0.18	12	5	2	951	231	26	18	75.7	97.3	98.1
Nov.	50.7	11.1	61.8	0.23	20	7	2	1,936	618	34	18	68.1	98.2	99.0
Dec.	50.7	10.6	61.3	0.24	16	6	2	3,050	1,360	57	15	55.4	98.1	99.4
1919														
Jan.	50.5	12.9	63.4	0.22	8	4	2	2,950	940	31	6	68.1	99.0	99.7
Feb.	51.2	10.7	61.9	0.12	7	3	2	2,380	700	30	15	70.6	98.8	99.3
Mar.	50.6	11.1	61.7	0.19	10	4	2	8,690	2,650	226	57	69.5	97.4	99.3
Apr.	46.9	12.9	59.8	0.60	28	6	3	9,520	1,836	117	20	80.7	98.8	99.8
May	50.5	9.6	60.1	0.60	18	7	3	5,500	440	50	20	92.0	99.1	99.7
June	51.0	16.2	67.2	0.53	15	6	2	1,477	132	55	22	92.4	96.2	98.5

pressure pumps through the distributing mains and to the city's reservoirs.

Should the proposed aqueduct enlargement work be completed, the filtered water will not return to the filtration pumping station but instead will flow by gravity from the filtered water reservoir to a new hydro-electric pumping station at the end of the aqueduct, and from that point will be delivered to the mains.

The filtration pumping station is a two-story structure about 80 ft. by 60 ft. The lower story is below the ground level and is traversed by the raw-water suction conduit and the raw-water discharge conduit, which are placed one upon the other. The direct-connected, motor-driven centrifugal pumps are arranged on either side of the central conduits in such manner as to obtain their supply from the lower, or suction conduit, and deliver into the upper or discharge conduit with a minimum of piping connections. Four of the pumps on the north side of the station are also similarly connected to a filtered-water suction conduit and a filtered-water discharge conduit, and provided with suitable check and controlling valves, equipped with standard hydraulic cylinders. This permits of one or all of these pumps on the north side of the station to be used for delivering the north water to the low level pumping station. Should a new hydro-electric pumping station be completed, and the filtered water flow to it by gravity, all raw water pumps in the filtration pumping station will be available for supplying the filters.

to keep the pressure in the new hydraulic system uniformly 90 lbs.

The blower and the wash water pumps are used in cleaning the pre-filters. The sump pumps remove seepage and drainage water. The six largest pumps and the blower are operated by motors using 2,200-volt alternating current. The other pumps operate under 550-volt current.

The upper story of the pumping station is above the ground level and, similar to all other buildings of the plant, has red brick walls and cinder concrete roofs covered with green tile. The north side of this upper story contains the chemical laboratory. The south side contains rooms for storage, etc.

The pre-filters, located east of and adjoining the pumping station, and supported by groined arches above the roof of the filtered water reservoir, are sixteen in number, each having a net filtering area of 1,200 sq. ft., arranged eight on each side of a central operating gallery. Each pre-filter is divided longitudinally by a central gutter into which empty the sixteen lateral reinforced concrete wash water gutters. The strainer and air system is made up of cast iron headers and 2-in. cast iron laterals, with brass strainers spaced at 6-in. centres. The filtering material consists of 15 ins. of gravel, graded into four sizes and placed in corresponding layers, and 30 ins. of filter sand. The details of a pre-filter unit is shown in Fig. No. 4.

Longitudinally through the centre of the operating gallery are two concrete conduits, placed one upon the other.

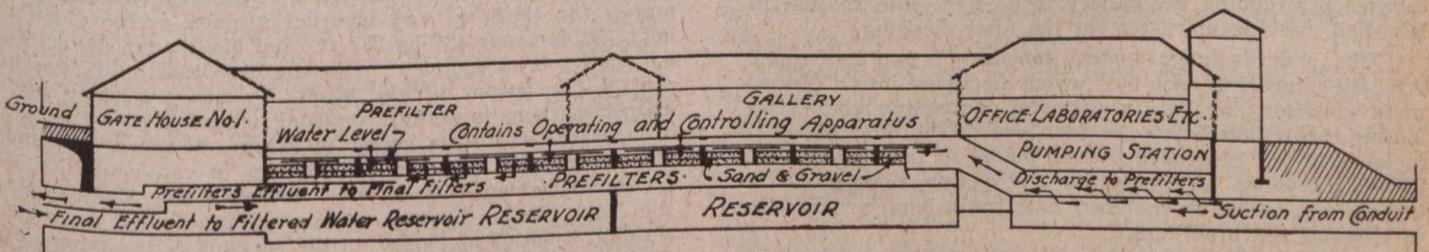


FIG. No. 3—SECTION THROUGH FILTRATION PUMPING STATION AND PREFILTERS