The paving we have considered is the same as specified in paragraph 38, page 8 of the specifications for contract No. 2.

The surface ice in winter is assumed to be two feet thick.

The tailrace is radically changed. It is widened from 113.85 feet to 172 feet; the bottom is paved with concrete one foot thick, and the grade altered from 4 feet to 2.5 feet in 2,900 feet, the bottom at the outlet remaining at elevation 2.00 above datum.

Under these conditions we estimate that the scheme is capable of the following power development: Winter, 13,000 h.p. (This power is subject to decrease or interruption on account of frazil or anchor ice. It is based on the lowest average winter month for 19 years (1895 to 1914); velocity in headrace, 2.82 feet per second); summer, 24,500 h.p. (Based on the lowest average summer month in two years, which is the only period of time for which we have any gauge records).

The maximum mean velocity in headrace is limited to 3.25 feet per second. The velocity in tailrace is limited to 8 feet per second.

We have estimated for a development of 13,000 h.p. winter and summer, which will be used as follows:—

Needed for pumping 100 M.I.G. per day....	8,570 h.p.
Needed for elec. current for filtration per day	1,910 h.p.
Total needed	10,480 h.p.
Excess power	2,520 h.p.
Total	13,000 h.p.

As in the case of Scheme 1, this hydraulic development must be supplemented by an auxiliary steam plant to provide power during times of ice and frazil troubles.

It is also assumed that the 13,000 h.p. above mentioned will be available for seven summer months. During the five winter months we have assumed that on the average there will be a decrease in hydraulic power equivalent to a complete shut-down of 2.4 months each year; during that time power will have to be furnished by the auxiliary steam plant.

Additional power over the 13,000 h.p. may be produced during the summer only, at a cost of $5.06 per h.p. or $6.74 per e.h.p. It has no market value.

We have not taken it into account in our calculations, except by providing foundations for a future extension to the power house, should it be decided later to utilize this additional summer power.

Thirteen thousand horse-power will pump a yearly average of 124,000,000 gallons per day, but in that case the summer average will be 142,000,000 gallons per day, and the auxiliary steam plant shall have to be used during the summer.

If instead of developing 13,000 h.p., 2,000 h.p. are developed in addition, out of the additional 11,500 h.p., then the summer average of 142,000,000 can be pumped by hydraulic power and the cost of operation on the h.p. basis will be reduced from $56.90 to $50.35.

Part of the balance of 9,500 h.p. may also be used to pump large quantities of water during the summer only, to provide water for fountains, parks etc., and to clean the streets. This water can be pumped at a cost of $3.20 per million gallons.

Another part of the balance might also be used for refrigeration of cold storage warehouses or to manufacture cheap ice. We have estimated from accurate data that the capital cost required for an ice manufacturing plant of a capacity of 300 tons per day, during seven months, if located at Atwater Avenue, would be $337,000. This amount might be diminished by about $60,000, if the buildings of the present pump-house (which would then have been moved near the filters) were used for the ice plant and as a garage for the motor trucks used in its transportation. This plant would manufacture ice from filtered water, at a cost of 54c. per ton. We have estimated that the cost of delivery at different central places, such as the bath houses of the city, would be about 45c. per ton, so that the cost of ice delivered (not distributed) would be about $1 per ton. One ton would provide 100 blocks of 20 lbs. of ice at a cost of 1c. per block.

We have calculated the cost of developing 13,000 h.p. summer and winter, as follows:—

Total cost	$10,609,000
Cost of operation	740,000
Amount charged for interest	1,299,398

Scheme No. 3.

Summer power	9,500 h.p.
Winter power	5,000 h.p.

Scheme No. 3 provides for enlarging the headrace with sloping banks without boulevards; the tailrace is the same as provided for in Scheme No. 1.

We limit the mean velocity in the headrace to 1.5 ft. per second. Two feet of surface ice will form in winter.

The lowest average summer month in two years is November, 1908, when the power produced would have been 9,500 h.p. The headrace is the controlling factor, and the velocity in the tailrace is 4.1 ft. per second.

The lowest winter month is March, 1912, when the power produced would have been 5,000 h.p., with headrace as controlling factor.

That part of the headrace situated in the rock section, 6,000 ft. in length, will be practically as shown on present plans, except that on the south side the bank will be sloping above the lodge instead of being supported by gravity walls as on the north side, where they are built.

In the east earth section, for a length of 14,000 ft., the banks slope 2 to 1. Between stations 140 and 128, the width at bottom will be 130 ft. Between stations 128 and 44, the width at the bottom will be 91 ft.; this section will govern. Between stations 44 and 0, the width at the bottom will be 122 ft. We have estimated the cost of Scheme No. 3 as follows:—

	Actual needs.	Future needs.
Total cost	$7,515,000	$8,205,000
Cost of operation	504,000	648,000
Interest charged	1,152,076	1,184,924

In this scheme there is no land for boulevards; the walls are built only in the western earth section, and the tailrace is built only large enough for the production of 9,500 h.p. It could be increased in capacity at some future time, as per Scheme No. 2, but in that case the tailrace would have to be enlarged and the walls demolished, and new bridges required for Wellington and Buffalo.

Cost of Pumping by Steam. (Scheme No. 4.)

In this scheme there are no boulevards. To pump 100 million Imperial gallons per day, we calculated, first, the cost of adding two new DeLaval pumps and new boilers to the existing plant.