

drainage area which has from time to time been extending both northerly and westerly. The outcome being the backing up and flooding of the parallel intercepting sewers, themselves much overtaxed, and the consequent flooding of tributary sewers.

Relief had to be provided before the northerly areas were developed and sewered. It was, therefore, decided to relieve the Garrison Creek sewer at its bifurcation to the northeast and northwest, just north of Arthur Street.

It is the intention of this article to describe the design of this relief sewer, called the main Garrison Creek storm

including all drawn in. It was found that 45 minutes was a fair average for concentration in the intercepting parallels, and that being the case, reference to the chart will show that a rate of 1½ inches per hour is indicated on the curve drawn. This rate was taken in all calculations for the storm sewers.

Rate of Absorption.—The rate of absorption was fixed arbitrarily for certain areas of the city from general knowledge of the localities, based upon a series of actual surveys, made for the purpose of ascertaining the proportional relation of impervious to pervious areas. The result of these surveys is given below:—

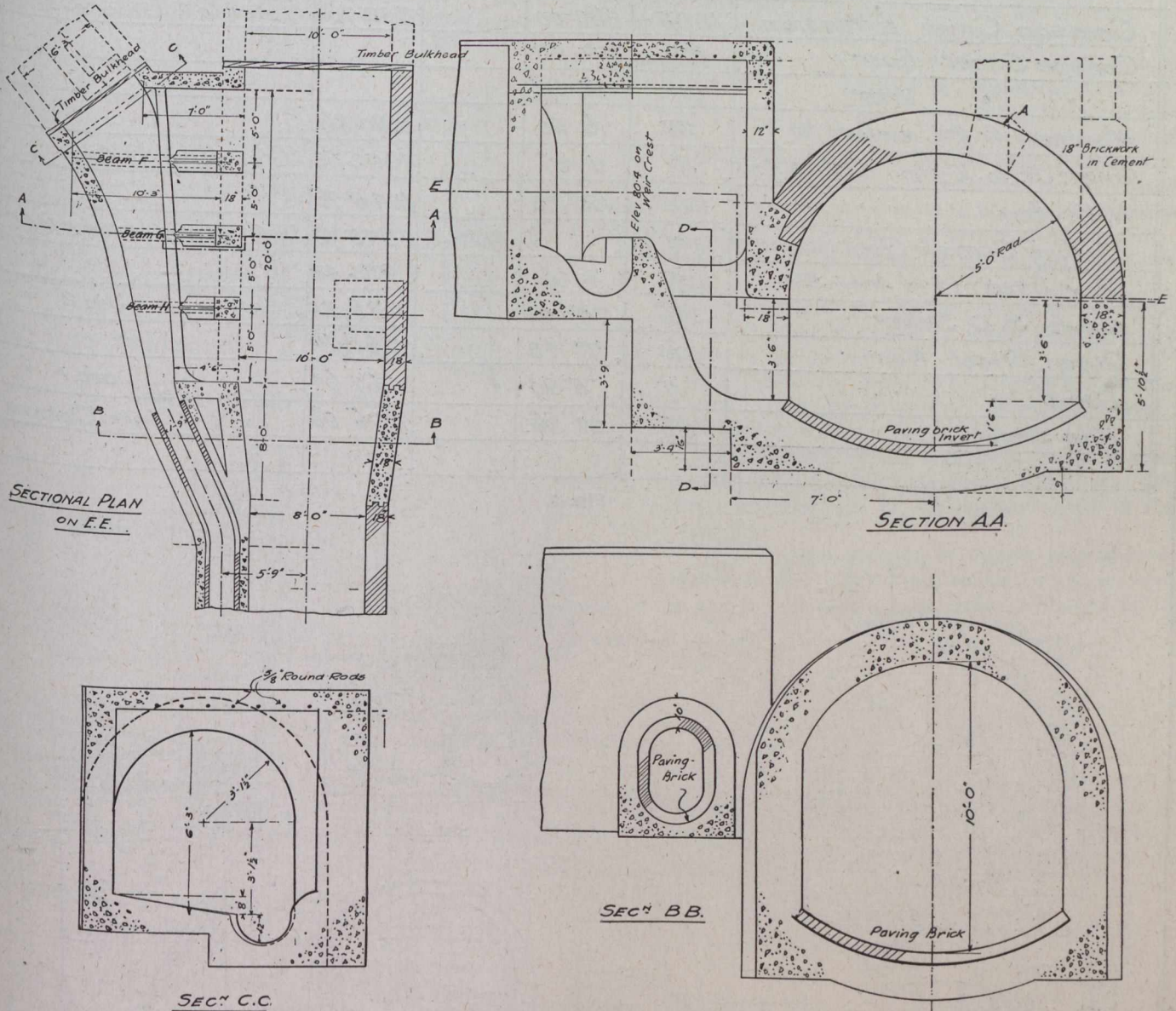


Fig. 8.—Weir Chamber, Argyle Street.

- overflow sewers. Sections 1, 2 and 3.
- In order to design the relief sewer the following particulars had to be ascertained:—
- (1) The existing and probable drainage area.
 - (2) The locations, elevations and drainage areas of parallel intercepting sewers.
 - (3) The rate of precipitation.
 - (4) The rate of absorption, etc.
 - (5) The probable discharge due to heavy rainstorms.

Drainage Area.—Fig. 1 shows the drainage area with the proposed relief sewers.

Rate of Precipitation.—In order to fix upon a rate of rainfall for which provision would be necessary, the diagram shown in Fig. 2 was prepared. The heavy rainstorms since 1895 are plotted by "diamonds" on this chart, and a curve

Population per acre.	Impervious Areas—Toronto.	Impervious area.
19	Open, good property	.19
24	Shops and old dwellings	.43
25	Good new property	.21
30	Good new property	.19
30	Good property, small gardens	.37
36	Good new property	.37
37	Good new property	.36
42	Good new property, large gardens	.26
50	Ordinary terrace houses	.36
55	Good new property	.37
60	Good new property	.33
65	Old terrace houses	.43