MUNICIPAL DEPARTMENT

THE MAIN DRAINAGE OF OTTAWA.

The question of extending the drainage system of Ottawa, Canada, has been under discussion for several years owing to the extension of the city limits and the rapid growth in population from 32,857 in 1885 to 57,000 in 1899. In December, 1893, Mr. E. H. Keating, M. Am. Soc. C.E., then city engineer of Toronto, reported on a system of trunk sewers for the undrained portion of the city; in August, 1896, Messrs. C. H. Keefer and R. Adams Davy, of Ottawa, reported on a system; and in May, 1897, Mr. Rudolph Hering, M. Am. Soc. C.E., reported as to the best method of draining the city. All of these reports were submitted to the ratepayers and voted down for various reasons, principally as being too expensive. Finally, in June, 1898, a plan prepared by Mr. Robert Surtees, city engineer of Ottawa, and approved by Mr. Keating, with the exception of a few minor details, was passed by the ratepayers, the estimated cost being $425,000. In the meantime, Mr. Surtees resigned, Mr. John Galt was appointed city engineer and Mr. Newton J Ker was appointed assistant city engineer in charge of the main drainage system.

The system, says the Engineering Record, consists of two large intercepting sewers, one draining the eastern and central portion of the city and the other draining the western portion. They carry both storm water and domestic sewage and were designed for a rainfall of 1½ inches per hour. The sewer draining the eastern and central portions of the city consists of three sections. Section 1 includes a double steel pipe outfall, 4,400 feet of brick sewer 7 feet in diameter and a double steel pipe crossing under the Rideau river; section 2 consists of 7,731 feet of brick sewer 6 feet in diameter; and section 3 includes 1.827 feet of 6-foot, 6,016 feet of 5-foot, 2,980 feet of 4-foot circular brick sewer and 1,332 feet of 2 × 3-foot egg-shaped sewer. Section 4 includes 6,400 feet of 5-foot and 1,640 feet of 4-foot brick circular sewer draining the western section of the city and discharging into the Ottawa river at a separate outfall.

The outfall on the first section, which is not yet built, will discharge into the center of the channel of the Ottawa river, where there is a depth of 40 feet and a current of one mile per hour. It will consist of a double line of steel pipes, each 5 feet in diameter, laid side by side to line and grade. One of the difficulties encountered was how to support these pipes, as there is about 20 feet of sawdust overlying sand at this point, the sand lying on rock. The river has a variation of 19 feet between high and low water, and on account of the Rideau falls and the Chaudiere falls being less than a mile up the river from the outlet, large masses of ice pile up and float low in the water and drag along the bottom. Consequently the pipes must be well supported and protected. To accomplish this it is proposed to lay them on piles in a trench excavated in the sawdust. The pipes are to be made in lengths of 30 feet, of ⅜-inch mild steel plate, all seams, both circular and horizontal, being securely rivetted and thoroughly caulked in a manner similar to good steam boiler work. Flange joints are to be used between the sections, the flanges being 4 × 4 × ¾ inches in size, rivetted to the pipes with ¾ inch rivets. Each face flange will have 18 bolt holes to suit ¾-inch bolts and oblong in shape, being ¼ inch longer than wide. All pipes are required to be perfectly water tight when completed, without using any packing or plugging. After the flanges are fastened in place the pipes are to be coated both inside and out with graphite.

To support the outlet and keep it in place, bearing and stay piles will be used, not less than 20 feet in length, nor the former less than 10 inches in diameter at the small end. The bents of these piles are to be driven alternately, one of each to each length of pipe. The bearing piles will be 10 feet from the outer end of each length of pipe and the distance across the trench between the centers of the piles will be 9 feet. They will be capped with 10 × 12 inch timbers 12 feet long, on which the pipes will rest. The two bents of bearing piles at the outer end of the outfall will be driven to the rock foundation. The stay piles will be driven by the sides of the pipes as they are laid, to insure their remaining in the proper position, and will be placed 5 feet from the inner end of each section. They will be spaced 11 feet 6 inches center to center across the trench and cut off at an elevation of 12 inches above the top of the pipes. The trench will be excavated for a depth of about 2 feet below the bottom of the pipes except beneath the joints, where it will be 3 feet deep, so that a diver may get beneath the same in order to insert and tighten up the bolts. After inspection, the trench under and around the pipes will be refilled in layers of 12 inches, tightly rammed, and carried up to the original level.

Between the brick sewer and the steel pipe outfall is a connecting chamber about 10 × 12 feet in size, built of brick except the bottom, which is of scoria blocks laid on a concrete foundation. The brick sewer enters this chamber at a height of about 9 feet above the bottom. One of the outfall pipes leaves the chamber at the level of the bottom and is 6 feet in diameter, decreasing to 5 feet at a point 10 feet outside the chamber. The other pipe leaves the chamber at a height of 11 feet above the bottom, dropping to the level of the first pipe at a point 20 feet away.

(To be Continued.)