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Two Toronto Sewers Built on Piles and Timber Bents

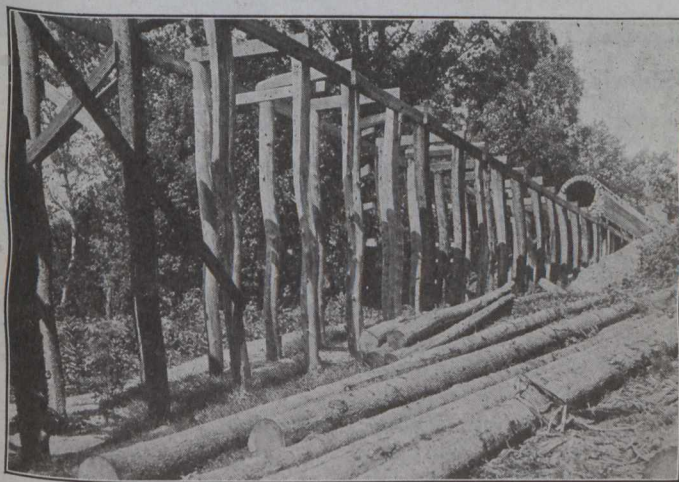
Involved Problems of Shifting Dead Weights and Strengths of Substructures Instead of the Usual Sewer Problems of Stationary Dead Weights and Nature of Ground Traversed

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THE trunk sewer for the southwestern section of the West Toronto sewer system passes east along Bloor Street from the west city limit at Jane Street to Pacific Avenue. From here it is diverted in a south-easterly direction, across the northeast corner of High Park and terminates at the stand-by tanks. (See article published in *The Canadian Engineer* of January 6th, 1916, for a description of the tanks.) During storms the excess storm water is diverted over a weir into the stand-by tanks, and the remainder is discharged into the trunk sewer on Keele Street which forms part of the high level interceptor that terminates at the main sewage disposal works located nine miles to the east. The Clendenan Avenue sewer, which is an outlet for a large district to the north of Bloor Street, is connected to the Bloor Street sewer. A large ravine crosses diagonally at the intersection of these two streets. The bottom of this ravine was much lower than the necessary elevation of the future sewers. It was, therefore, necessary to fill in the ravine at this point to provide a foundation for the sewers and a roadway over them. The problem then arose as to whether it would be more economical to build a temporary pumping station to serve until this fill would have settled

ground, but near the bottom of the ravine, where the ground was of a soft, boggy nature, piles of as great a length as 50 ft. were required, and these were driven to the surface of the ground. In odd places even this length was not sufficient and it was necessary to splice the piles with 1½-in. steel dowel pins. Four rows of piles were driven here where two had been planned, and timber



Piling and Sewer Under Construction

sufficiently, to provide a firm foundation for the sewers, or to drive piles at once to support them. It was decided that the latter would be much the cheaper method and this plan was accordingly adopted.

Piling and Timbering

The original plan provided for piles 10 ins. in diameter at the small end to be driven at 5-ft. centres and lengths given that provided for a penetration of from 12 ft. to 15 ft. These lengths proved to be sufficient on the high



Material was Dumped Over Banks of the Fill Instead of Being Raised by a Donkey Engine

bents were used to bring them up to grade. Often the piles at this low place would sink several feet with their own weight, a thin clay seam would then intervene, and the pile would drive hard for a few blows, then would drive easily again, and so on till the minimum penetration was reached, which was a resistance of 1 in. per minute.

The sewer on Clendenan Avenue was built by Messrs. John Maguire & Son, while the Bloor Street sewer was built by the Orpen Contracting Company. Two outfits of pile drivers were therefore used. The former firm used a 500-pound drop-hammer with 50-ft. leads, while on Bloor Street the contractor used a 3,000-pound steam hammer with an 18-in. piston striking 120 1,000-pound blows to the minute, and leads 50 ft. long. Generally six 50-ft. piles driven was considered a good day's work, while the maximum reached was nine on Bloor Street. Many delays were caused owing to the location of the work, necessitating a constant raising or lowering of the engine and leads, while ascending or descending the sides of the ravine.

As before mentioned, it was necessary to build timber bents when the piles were driven below grade. These timber bents were in some cases 30 ft. high, but the same sized timber was used for all. They were built of 6-in. x 8-in. uprights, 8-in. x 10-in. caps and sills, 2-in. x 6-in.