been removed all joints are pointed and all spilled mortar removed from the inner surface of the sewer. The backfilling commences immediately upon collapse of form or as soon after as feasible. The earth is thoroughly tamped to fill voids from pulling sheeting.

At the discharge or spill end of sewer a concrete apron is usually installed to insure against washing away of tamping or foundation.

The city of Flint, Mich., recently completed a 42 and 48-in. outfall sewer built of salt glazed vitrified clay segment blocks. A construction view of this sewer is shown in Fig. 1.

Sewers built of these blocks in the manner described are said to be watertight. They also are as durable and impervious as vitrified pipe. The frictional resistance to the flow of water in these sectional block sewers is claimed to be considerably less than any other type of construction adapted to the same class of work. At the same time tests have shown that the load carrying capacity is large. The type of block construction here described is manufactured by the American Sewer Pipe Co., of Akron, Ohio.

KEEPING RECORDS OF MUNICIPAL IMPROVE-MENTS AT FARGO, N.D.*

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The city engineer's department has felt the need of complete and accurate maps of the city for all purposes, and I believe, and in some instances know, that serious errors have been made by relying on maps that were unreliable.

Two sizes of maps have been adopted for our use. A large map on a scale of 200 ft. to the inch shows all sections, quarter-sections, additions, streets, avenues, alleys, and blocks and lots. On these maps will be plotted all municipal improvements, such as sewers, water mains, sidewalks, paving, and such general information as can be of use. This size is for wall purposes.

A second size is made up on a scale of 100 ft: to the inch and each sheet contains one quarter-section, making the size of the sheet 26 x 26 in. On this map, in addition to data on the larger maps, are sewer wyes, sewer connections, water-main connections, valves, shut-off boxes, hydrants, paving, openings in paving and date made, cost of special improvements against each lot, sidewalks, new buildings, the lighting system and a great deal of minor data connected with the above. At present none of these data is collected in a compact form that can be used to any advantage and in that respect this department has not been kept up to the needs of the city. In no other way can such information be kept available for instant use than by progress maps. This work has taken a great deal of labor and painstaking research and when completed will form one of the most valuable records in the office.

There are no more valuable records in any engineer's office than progress records and maps, and this applies with great force to the work of municipal engineering. Data on work constructed and completed are wanted at all times by a great many people in all lines of business. Some desire data for mere curiosity; but the great majority want them because their business is more or less affected by such information. In many cases the health and safety of the public depend on the absolute correctness of the data. It seems a foolish policy for an office not to make a record of work done at the time it is done, when oftentimes such record can be correctly made at a small cost, when if left undone irreparable damage may follow. We have daily calls

* From the report of the city engineer of Fargo, N.D., 1910-12.

for information, that we should be able to give and that it is the function of the city to provide to its citizens, that cannot be given because of lack of records. It is the aim to eliminate this state of affairs as rapidly as is possible. The data must be picked up in all manners of ways and time is the greatest factor in its completion.

The lack of records in the office is an unfortunate condition that has hampered our work greatly during the past two years. Efforts to remedy this defect have in some cases proved effectual, but in other cases there is no remedy whatever. As such may be mentioned lack of actual cost of contract work, time when certain contracts were begun, progress of same and time of completion; surveys made, results and conclusions; location of monuments, opening in streets, street lines, grades for sidewalks and streets and data upon which made; data upon which sewer and water mains have been designed, and cost of office work.

A complete office system has been started in order to eliminate these defects in the records. The loose-leaf system is used throughout. The lack of notes on surveys, time the men were employed on any piece of work and sidewalk records, was most noticeable and this has been remedied. The loose-leaf system of field notes was adopted, and a filing system is used which I have every reason to believe is original. The field-note sheets are $4\frac{1}{4} \times 7\frac{1}{4}$ in. These sheets are pasted on 5×8 -in. division index cards which have the usual 5-cut tab. On this tab the character of the work is printed and the indexing completed. The time of men employed and any class of work is kept in a similar manner.

For the purposes of engineering the records of costs have been divided into heads as follows: Board of Health; Bridges; Dam; Maps; Monument Lines; Office Supplies; Park Commission; Paving; Pay Roll; Requisitions; Sewers; Street Grades; Street Lines; Waterworks; Water Mains and Sidewalks. Each of these is subdivided into two heads: (1) Construction, and (2) Maintenance. Each of these subheads is subdivided again into Labor, Material; Engineering and Estimates.

TRANSPORTATION QUESTION IN CALGARY.

The proposed piping of natural gas to Winnipeg from the Bow Valley by Calgary capitalists, with four or five pumping stations, commencing somewhere about Swift Current, which would force the gas to Winnipeg, is meeting with various objections. Mayor Spencer, of Medicine Hat, objects to a charter being granted the new company, and the Calgary Herald demands either Provincial or Dominion prohibitive legislation.

The Interurban Railway Company is acquiring 13 acres of the industrial tracts owned by the city, for use as the site of a repair shop.

A mile of street railway track is to be built by the South East Calgary Corporation, from Ogden station to the city limits. This will be handed over to the city of Calgary in return for a service operated by the municipal system over the tracks of the South East Corporation.

Plans of the Western Dominion Railway Company, considered by the board of trade this week, have the name of J. E. Askwith as president. This did not, however, convey enough information to the committee, and they decided to recommend approval of the map filed provided the promoters could assure them of immediate construction. The line is variously ascribed to the Canadian Pacific Railway, Canadian Northern Railway and Great Northern interests. It will open a country between the international boundary and the Peace district (passing through Calgary), which contains a vast area of clays, shales, coal, natural gas, tar, sands, and possibly oil.