

CITY ENGINEER'S REPORT.

CITY WORKS DEPARTMENT.

COMMITTEE ON WORKS 1910-11.

JOSEPH A. CHISHOLM, Mayor, *Chairman.*

ALDERMAN ALFRED WHITMAN, ALDERMAN GEORGE A. MACKENZIE.

OFFICIALS :

F. W. W. DOANE, M. CAN. SOC. C. E., *City Engineer.*

H. W. JOHNSTON, C. E., *Assistant Engineer.*

T. W. J. LYNCH, *Surveyor and Draughtsman.*

MISS HELEN M. DUSTAN, *Stenographer and Accountant.*

WATER WORKS.

EWEN MORRISON,.....*Foreman.*

DANIEL J. McLEAN,.....*Assistant Foreman.*

W. P. MORRISCEY,.....*Plumbing Inspector.*

ARTHUR L. SMITH,.....*Meter Foreman.*

JOHN E. BURNS,.....*Chief Water and Meter Inspector.*

W. H. DANIELS,.....*Service Foreman.*

STREETS, SEWERS, &c.

JOHN McDONALD,.....*Foreman.*

JAMES DOWNIE,.....*Assistant Foreman.*

OFFICE.

JAMES J. HOPEWELL,.....*Clerk of Works.*

MISS MINNIE HUNTER,.....*Stenographer.*

CITY ENGINEER'S OFFICE, CITY HALL,
HALIFAX, N. S., May 1st, 1911.

To His Worship the Mayor:

SIR,—I have the honor to submit my twentieth annual report dealing with the public works of the City, under the supervision of the City Works Department:—

WATER WORKS.

Amount of funded debt on Water Account.....	\$1,183,441 00
“ transferred from revenue.....	36,000 00
“ of funded debt redeemed by sinking fund ...	8,000 00
“ “ “ revenue	30,000 00
“ “ “ premiums on loans...	4,073 33
	<u>1,261,514 33</u>
Amount expended to April 30, 1910...	\$1,243,137 30
“ “ 1910-11.	\$15,648 30
“ repaid 1910-11.	4,734 10
	<u>10,914 20</u>
Total cost of Water Works to date.....	1,254,051 50
Balance on hand.....	\$7,462 83
Amt. paid into sinking fund in excess of debt redeemed	32,714 00

COST OF MAINTENANCE, 1910-11.

Interest	\$52,065 64
Sinking Fund	4,857 00
Maintenance of system	35,608 22
	<u>\$92,530 86</u>

Or 7.38 per cent. of the total cost of the system to date, interest and sinking fund being 4.54 per cent., maintenance and renewals 2.84 per cent.

The following statement shows the revenue and expenditure for the last ten years—two years showing a deficit:—

YEAR.	Amount collected.	Amount expended for, Maintenance including Sinking Fund.	Deficit for Year.	Surplus for Year.	Amount to be collected Oct-6, 1910 (Col. lector's report to Council).
1901-2	\$77,181 50	\$68,207 29		\$ 8,974 21	
1902-3	87,502 52	70,037 57		17,464 95	
1903-4	78,910 50	75,246 11		3,664 39	\$ 696 04
1904-5	95,280 28	84,597 32		10,682 96	1321 24
1905-6	81,725 39	89,436 95	\$ 7,711 56		1471 47
1906-7	90,593 34	78,165 87		12,427 47	3248 00
1907-8	84,996 82	105,793 52	20,796 70		5635 60
1908-09	96,750 94	81,945 34		14,805 60	
1909-10	112,667 37	91,114 62		21,552 75	
1910-11	100,012 28	92,530 86		7,481 42	
			\$25,508 26	\$97,053 75	

There has been a nett surplus in the ten years of \$68,545.49, an average of \$6854.54, or about one-half of one per cent. on the cost.

During recent years the surplus has been used to replace worn out distribution mains, and practically all such work requiring immediate attention has been overtaken.

RENEWALS.

The most important renewal work was the substitution of pipe twelve inches in diameter for the six-inch pipe on Morris Street, between Pleasant Street and Park Street, and the nine-inch pipe on North Street, between Lockman Street and Brunswick Street. The former has made considerable improvement in the neighborhood, while the latter permits a better fire service in the vicinity of the railway station and King Edward Hotel. One thousand nine hundred and ninety-one feet of six-inch pipe was renewed on Albemarle Street.

NEW WORK.

Distribution mains were laid for seventeen extensions of the water service. Two were in the low service and fifteen in the high service district, the total length of new mains laid being 6229 feet. The total length of mains now in use is 76-1/5 miles. In 1900 the length was 67.9 miles.

The extensions included two important changes in distribution, one in the south end, the other in the north. On Oxford Street a pipe twelve inches in diameter was laid, from Quinpool Road to the end of the main between Jubilee Road and Coburg Road. On the completion of the work, the district from Lilac Street to the Arm, which was formerly supplied from the high service system, was transferred to the low service, thus reducing the consumption in the high service. It will be necessary in the future in order to give a satisfactory service, to replace 351 feet of six-inch pipe laid north of Coburg Road with twelve-inch pipe. Later, as that section is built upon, 466 feet of six-inch pipe, laid south of Coburg Road, may also have to be replaced.

The Agricola Street nine-inch pipe will give a better supply to the Merkelsfield district when the old six-inch pipe between Macara Street and Bilby Street has been replaced by larger pipe. This section has been obliged to get along with the capacity of a six-inch pipe from Gottingen Street. Several dead ends in the North end were connected through, improving the circulation.

Twenty-five new main stop valves and seventeen hydrant valves were added, and seven old valves were removed. The total number in use is nine hundred and fifty-nine.

Nine new hydrants were placed in service, increasing the total to 465. Eleven old hydrants were replaced with improved City design frost jacket hydrants with steamer nozzle. Last year (1909) a new design was made for the base of the hydrants, providing a larger and less obstructed water way. All new hydrants are constructed on this pattern.

Four thousand eight hundred and ninety-nine feet of pipe was laid for one hundred and thirty-six new services, and three thousand nine hundred and five feet of old service pipe was renewed. About ninety-five of the new services were in the high system. The total number of service pipes laid is 7724.

Fifty meters were installed during the year. The total number in service at the end of the year being 1382. In 1900 there were 458. The number of meters repaired during the year was 137, or 9.9 per cent. of the total number in use, 40 of which were repaired in service and 97 in the shop. The average cost of repairs was

35-1/10 cents per meter repaired, or 3½ cents per meter in use. The percentage of service pipes metered is 18.

CLEANING MAINS.

On Tuesday, the 5th day of July, 1910, the cleaning of the high service main was undertaken as usual. A heavy rain had fallen during the night, but as water consumers had drawn a supply for the day it was decided not to disappoint them. The 20-inch scraper was run through 6712 feet of pipe successfully in 27 minutes, and the 15-inch scraper was inserted for the run to the City. The 15-inch valve could not be closed behind the scraper in consequence of the face ring of the valve coming off (discovered on removal later for repairs). The result was the premature starting of the scraper by the pressure of the water which got through the valve. Before it stopped it had run into a section of the pipe which was several feet under the flood water in the bog through which it is laid. When the full pressure was turned on the scraper could not be moved. The work of locating it was begun without a moment of unavoidable delay, but the depth of water over the pipe prevented rapid progress, and it was not until about nine p. m. on Friday that the scraper was removed. Excavations were made along about a mile of pipe before the exact location was determined.

During the water famine the low service was turned on where it would supply, and those who could not be reached by the low service were supplied by sprinkling carts.

In 1881 the 15-inch scraper stuck fast in the main and had to be cut out, and in 1892 it happened again. A telephone line was constructed along the pipe line in 1893, so that the necessity of driving nine or ten miles for supplies, tools or assistance, might be avoided. By using a portable telephone with a bamboo rod connection to the overhead wires, "Central" was available at every excavation, and much valuable time was saved in consequence.

In September, before the Exhibition, both high service scrapers were put through without accident, the 36,340 feet of 20 and 15-inch pipe being traversed in 4 hours and 44 minutes.

RESERVOIR.

In the City Engineer's report for 1892-3 will be found the following paragraph:—

"In reporting on the new main I stated that the high service would not be completed until a storage reservoir is constructed in the City, capable of containing several days' supply. When the water is turned off now there is great danger of a fire gaining headway before the pipes could be filled again, and the result of any accident to dams or pipes, cutting off the supply, would be serious."

The advantages of such a reservoir are generally that while in long mains the effective head and consequently the discharge is diminished by the friction on the sides of the pipes and the various curves and bends, the reservoir collects near the centre of distribution a large quantity of water at perhaps nearly the full elevation of the source of supply, and by a system of valves equalizes the pressure upon the service pipes and hydrants. In case of accident to the main or during cleaning operations, the City would be supplied for a time proportionate to the capacity of the reservoir, independent of the lakes. The water discharged into the reservoir during the night, or while the consumption is lightest during the day, is fed out to the overworked main during the time of greatest consumption, when the draught becomes too great for the capacity of the pipe. In Halifax, however, the night draught is heavier than the day in winter, and in no season is there a light draught at any time of the day or night. Until the waste is stopped not a drop of water would reach a reservoir constructed on the highest land, and consequently the money expended on it would be wasted. As soon as the waste is stopped, a storage and equalizing reservoir should be constructed. Its greatest benefit would be apparent during fires.

CONDITION OF HIGH SERVICE.

The scarcity of water became more serious than ever before. At the beginning of the winter season, immediately after cleaning the supply main the night pressure at the Superintendent's house was 50 pounds. The January (1911) cold snap tumbled the pressure down in a few hours. At 10 p. m. on the 16th it had fallen to 35 pounds, and at 6 a. m. on the 17th it had dropped to 25 pounds, falling a few hours later to 24 pounds, and remaining in that condition for several days. The water would not run to Duffus Street and many houses in that and other neighbourhoods were without water, while in many other houses, it would not rise above the cellar taps. So

many taps were allowed to run, that the water could not rise to the higher streets. The supply main was taxed to its limit. The quantity drawn through it on January 18th, 1911 was 2,371,000 imperial gallons and if that rate were continued, it would not take long to drain the lakes.

An army of inspectors could not stop the waste when the consumers do not have to pay for it.

WATER PRIVILEGES.

Section 4, Chapter 41, Acts of 1911 provides that—

“The City of Halifax shall furnish to said Nova Scotia Car Works, Limited, each year for a period of twenty years from the date hereof, five million gallons of water free of cost and charge to said company, and shall also furnish all water taken by said company in excess of five million gallons, at the rate of seven and one-half cents per thousand gallons.”

Section 2, Chapter 43, Acts of 1911 provides that Moirs Limited shall be exempt until April 30, 1932, from meter rates on two million five hundred thousand gallons of water each year, but for any excess over such quantity they shall pay at the usual meter rate charged by the City. This exemption shall not apply to any retail shop used by the Company other than the one at present conducted by it, nor to the fire protection and pipe rate.

METEOROLOGICAL RECORDS.

The number of days on which precipitation was recorded, was 200, and the total, 67,381 inches, is 119 per cent. of the mean for the past forty-two years (56,667 inches.)

Long Lake reached its lowest level on the 22nd day of October, when the surface of the lake was 202.15 or 3.84 feet below the waste weir. Spruce Hill Lake rose to 364.69 on April 23rd and dropped to 362.20 or 1.14 feet below the waste weir or Sept. 1st.

FENERTY VS. CITY.

Mr. E. L. Fenerty's suit for damages was decided in favor of the City. The City Solicitor reporting to the Council on this matter, said :—

"As there appears to be some confusion as to the difference between this action and the previous one brought by Mr. Fenerty, I may add a word of explanation.

"Both actions were brought in respect to the rights of the proprietors of property along the stream leading from Chain Lakes to the North West Arm. In the former action, Mr. Fenerty claimed that we had diverted some of the water which should have gone to his mill, and also set up extensive claims for storage in the lakes. Upon investigation, the City Engineer was satisfied that we had, during the great drought in 1905, diverted some small quantity of water, and we tendered \$100 in payment of damages, which Mr. Fenerty accepted, and consequently no inquiry was made in that action as to the mode by which the water was measured by Mr. Fenerty in substitution for the stream which would have flowed naturally but for the City's dams.

"The action was fought out on the question of storage, on which the City was successful.

"In the recent action, Mr. Fenerty again claimed that we had diverted the water, which we denied. It was consequently necessary to go to trial upon the question of whether or not the system of measuring the water to Mr. Fenerty, originally adopted by Mr. Keating some twenty years ago, and continued by Mr. Doane, was or was not correct. If it had been proved not to be correct, and the City compelled to adopt the one set up by Mr. Fenerty, the consequences would have been most serious for the City, practically depriving us of the use of the Chain Lakes.

"I am very pleased that the judgment of Mr. Justice Drysdale, a copy of which is submitted herewith, entirely confirms the City's method. As no appeal has been taken from his judgment, it would appear that the vexatious question of long standing between the City and the riparian property owners has at last been settled definitely in the City's favor."

F. H. BELL, *City Solicitor.*

The preparation of this case involved a great deal of work and

the calculations, records and statements have been filed for future reference. The judgment of Mr. Justice Drysdale is as follows:—

FENERTY ET AL. VS. THE CITY OF HALIFAX.

DRYSDALE, J.

After the argument of this case I did not get all the exhibits until I had to take up my fall circuit. Since returning I have again gone over the extended notes.

At one stage of the argument both sides seemed to agree that the plaintiff's rights were based on the natural flow of water coming from the Chain Lake Valley or watershed as conditions existed in 1846, but later plaintiff's counsel seemed to argue that he is entitled to a greater flow by reason of the City increasing such flow from bringing into the Chain Lakes other streams, and by reason of their extensive storage dams, relying upon dicta cited to the effect that if water is added to a natural stream by artificial means it becomes a part of the natural stream and subject to the same natural rights as the rest of the water. This latter contention is I think, however, concluded as against the plaintiffs' by reason of the deed or agreement of 1846, made between the predecessors in title of the plaintiffs on the one part and the predecessors in title of the City on the other part. In and by that deed the right to bring the Long Lake waters into the Chain Lakes for storage purposes, and for supply to the City from the latter lakes by means of pipes is expressly given, and the right of Hosterman, plaintiffs' predecessors in title, to water expressly limited to the quantity naturally flowing from the Chain Lakes theretofore. Since the said deed the City has connected said lakes, constructed large dams, and made one large watershed, and it seems to me quite clear that the plaintiffs' rights must be based on the natural flow from the Chain Lake Valley based on conditions as they existed before the date of said deed and quite apart from any increased flow that may have been caused by the City's works.

This brings me to a consideration of the plaintiffs' evidence in support of his allegation that the City in the summer months of 1909 deprived him of water that he was entitled to for his mills; in other words that they did not let down to his mills the natural flow of the Chain Lake Valley to which he was entitled. Outside of a few personal visits by himself to Bayer's Brook, and very casual

inspections of such brook which I do not think I can consider under the evidence as reasonable proof of plaintiffs' claim, his whole case is based on the theory that he is entitled to one-fifth of the entire waters collected from the large watershed and the whole City works. No evidence was given as to the volume of water that would come from the Chain Lake Valley as it existed prior to 1846, but plaintiff contents himself with an estimate based on the fact that the Chain Lakes watershed forms about one-fifth of the whole watersheds that now feed the City's storage, takes the total amount fed to the City through the pipes, and claims one-fifth of the waters so used plus an allowance for evaporation. And taking this estimate as proof of the plaintiffs' claim he can afford to abandon the item of evaporation. After giving the plaintiffs' theory—for it is only a theory—full consideration, I am forced to conclude that it is not reliable, and it does not satisfy me that it makes out the case that he can only succeed upon, viz.: That he has been deprived of any water that he is entitled to based on Chain Lake conditions of 1846. Mr. Doane, the City Engineer, makes cogent criticism in respect to Mr. Fenerty's data. The latter's statements are obviously mere guesses in many respects, and the proof to my view falls far short of satisfactory evidence that the plaintiffs' have been deprived of any rights to which they are entitled.

The plaintiffs have the burden of establishing that they have been deprived of water to which they were entitled, and in this I think they fail. From the system adopted by the City for ascertaining the natural flow of Chain Lake Valley, I am satisfied the plaintiffs' have been getting quite all the water to which they were entitled.

By the use of the measuring board at Bayer's Brook a satisfactory basis for the calculation of the Chain Lake waters is, it seems to me, established. It is true this board was out for a time in 1909, but the attendant who had worked the outlet and watched the inlet satisfied me that during the season of 1909 the plaintiffs had not suffered.

I am of opinion the plaintiffs' action fails and must be dismissed.

DENNIS VS. CITY.

Mr. William Dennis removed the water meters from the Herald

Building and two other buildings on Granville Street and refused to allow the City to replace them. At the Herald Building the meter was installed in the street. The City Solicitor reports the history of the action respecting the other meters, as follows:—

“The facts are briefly as follows:—

“Water meters have been installed in the two properties Nos. 96 and 106 Granville Street owned by Mr. Dennis for two years. Recently, Mr. Dennis removed the meters and returned them to the City, and when requested by the Engineer to allow them to be replaced, refused permission.

“The Engineer thereupon, acting on what has been the hitherto generally accepted view of his power, notified Mr. Dennis that unless permission was given to replace the meters, the water would be turned off.

“Mr. Dennis thereupon began an action to obtain an injunction against turning off the water and obtained a temporary stay of proceedings from Judge Graham, returnable in one week. Under the authority of the Mayor, I entered an appearance to this action and opposed the application for continuance of the injunction.

“The matter was heard before Judge Graham on the 28th of November, and a decision was given by the learned Judge on the 7th inst., dismissing the injunction and entirely sustaining the City's contentions.

“Mr. Dennis' counsel has intimated to us his intention of appealing, and I have consented to an immediate disposition of the appeal, as it is most desirable that the question should be disposed of at once, because in my view, if the contention set forth, now, for the first time by Mr. Dennis is to prevail, the consequences to our water system and the income derived therefrom, would be most serious.”

F. H. BELL, *City Solicitor.*

Judge Graham's decision was as follows :—

DENNIS VS. THE CITY OF HALIFAX.

GRAHAM W. J.

"The City Engineer of the City of Halifax, under the authority of the statute, as is contended, and duly authorized in that behalf on the 4th of April, 1908, placed on the plaintiff's premises numbered respectively 96 and 106 Granville Street, water meters. They have been there for upwards of two years. The front walls of both premises are on the street line. The building No. 96 consists of a shop and offices having two closets and two taps, and No. 106 consists of an office and rooms on the next floor occupied by the janitor of the Herald Building and rooms on the one above occupied by a Mrs. Yetman. I has one closet and two taps.

"The plaintiff complaining that the meters were inaccurate had them removed. It appears that the water rates previous to the introduction of the meters by assessment had been for six months for No. 96, \$6.70 and for No. 106, \$6.50 ; while for six months in 1910 the cost by the meter rates including rent of the meter was for No. 96, \$2.06 and for No. 106, \$1.69.

"The meters in my opinion correctly indicated the consumption of water. They were tested and were found to be accurate. The evidence shows this fact.

"On the 11th November the City Engineer addressed to the plaintiff the following letter :—

"The foreman of the Water Department reports to me that the meter has been removed from the service pipe through which water is supplied at the premises 96 Granville Street. In the performance of my duty as City Engineer I am obliged to notify you that I have instructed Mr. Morrison, Foreman of the Water Department, to replace the meter, and further that if he is prevented from placing the meter in service again he is to turn off the water from the premises 96 Granville Street."

"A similar letter was addressed to the plaintiff in respect to No. 106.

"The right to do this and to write this letter is indicated by the City Charter, Section 479, which I shall cite presently.

"Upon the strength of receiving these letters and a visit from the official to replace the meters plaintiff applied for a restraining order.

"The right to place the meters on the service pipe inside of the plaintiff's premises, is it is contended, conferred by the City Charter, 1907.

"Section 464 provides that the City Engineer, "may at any time he deems proper cause a water meter to be placed on any service pipe supplying water to any premises."

"Plaintiff's council contends that this means on the service pipe outside of the limits of the water taker's premises, or if, as here, the wall is on the street line, then no further within than in the wall of the premises.

"The defendant contends that this means on the service pipe as long as it is a service pipe, a supplying pipe that is up to the point where the pipes of distribution on the plaintiff's premises begin.

"I agree with the latter contention. By section 469;

"The occupant of the premises shall be responsible for the care of any water meter installed in respect to the same. And if any person injures or tampers with a meter in any way, such occupant shall be liable upon summary conviction to a penalty of not less than \$10 nor exceeding \$100, or, in default of payment to imprisonment for a term of ten days to three months.

Section 470 :—

"Anyone wishing to supply a meter for his own property may do so upon the approval of such meter by the City Engineer and the sanction in writing of the committee on works.

Section 479 :—

"Any official of the City shall have the right to enter into any house building or premises in the City and every part of such house &c. in which he supposes there are any water pipes or fittings, between the hours of &c, and remain there for any such reasonable length of time as is necessary for the purpose :—

(h) for fixing, examining or reading any water meter.

"2. Every person who (after notice) prevents his entry into any such house, or interferes with him in the discharge of his duty—shall be liable to a penalty—and the City Engineer may in addition cause the water to be turned off from the premises of such offender.

Section 610:—

"The lakes, &c., water mains, service pipes, hydrants and all other property or works connected with the water supply, &c., shall continue to be the property of the City for all purposes."

Section 612:—

"In the laying down, construction repairing and alteration of any main pipe or service pipe the Committee on Works, &c., may from time to time, as occasion requires, enter upon any lands or tenements in the City whether occupied or not, and may remain thereon—for the proper execution of the work, and may make any such excavation on the premises as is deemed expedient, and take up and remove any floor, &c., or any wall, fence or erection whatsoever, &c., &c."

"No such entry shall be made—without permission of the occupant if resident on the premises being first requested, &c."

Section 613:—

"The owner of any dwelling house situated on any portion of a street through which a main pipe is shall be entitled on application, &c., to a service pipe one-half inch in diameter to such house.

(2). Such service pipe shall be laid at the expense of the City from the main pipe to the line of the street and through the wall of the house, if the wall is on the line of the street.

(3) The cost of laying such service pipe beyond the line of the street shall be borne by the applicant.

(4) When the service pipe has been put into any house or premises without objection by the owner to the position of the same, no subsequent removal or alteration of the position of the pipe shall be made except at the expense of the owner."

Section 614:—

"If any house so situate stands back from the line of the street

the owner thereof may apply to the Committee on Works to do the work of extending such service pipe from the line of the street to the house."

(Provision for defraying the cost out of a deposit to be made by the applicant).

Section 615:—

"The owner of any dwelling house so situated may request that—

- (a) More than one such service pipe, or
- (b) A service pipe more than one-half inch in diameter shall be laid to such dwelling."

(Provision for defraying the cost out of a deposit to be made by the applicant).

"From these provisions I think it is clear that a pipe from the main pipe in the street extended to and inside of the wall of the house supplying water is called a "service pipe," and whether the house is on the line of the street or back from it. It is a service pipe even "beyond the street line." I use the words of a section just quoted. It is not a "service pipe" at one stage and a "supply pipe" at another. Even the dictionary does not make any such distinction. In some of the old legislation these terms may have been used, but they meant the same thing.

"That the owner of a property back from the street bears the cost of putting the service pipe from the line of the street to the premises is not very material. Take the sidewalks of the City and their construction for an illustration. Who owns them; who is obliged to keep them clean; who bears the cost of putting them in asphalt or concrete? All different persons. If a citizen's residence is an eighth of a mile from the main it would not be fair to the other citizens that the City should bear the whole expense of the convenience afforded to him by connecting him with the main. No matter at whose cost the pipe is put in, or even to whom it belongs, it is called a "service pipe," within the wall of the premises. The elaborate provisions in connection with the laying down of or repairing of the service pipes permitting the entry on the premises and whether occupied or not, and at reasonable hours, and for remaining there a reasonable time, and for making excavations there, and for removing the floor, wall, &c., all show that such a statutory license

was necessary, but it could only be necessary if the service pipe was upon the premises and within its walls. Merely to insert it in the wall would not require all that kind of work. It must go a reasonable distance on the inside of the wall for the purpose of connection and use. That is a necessary incident if not expressly said. If the City is to lay a pipe to his premises that does not mean outside of the wall of his premises. That would not be carrying water to his house. The legislator is so accustomed to gas meters and electric light meters on his premises that he would reasonably think that the water meter was to be there also.

“Then if the meter is not to be placed on the service pipe within the wall, why is there the elaborate provision giving the City official license to enter the *house, building or premises* at reasonable hours and remain there a reasonable time for fixing, examining or reading any water meter? The meter could not be fixed, examined or read in the house if it was fixed outside of the house and necessarily under ground. I cannot restrict that provision to apply only to meters laid before the legislation was passed. No rule of construction would permit that. The City Charter must be construed as a whole. Then why is the occupant of the house to be made responsible for the care of the meter, and liable in a penalty for any tampering with the meter by third persons if the meter is not in the house? I think all of the legislation points one way.

“In this case I think the position in which the meters had been before they were removed was reasonably close to the wall. But the plaintiff did not put forward in his letter any such ground as that. In his affidavit he says:—

“No attempt has been made to place said meters on any service pipe, but Ewen Morrison, the foreman of the water department of said defendant City of Halifax requested me to allow him to replace said meters on the inside plumbing of my said two premises, which I refused to do.”

“That was a sufficient interference with the official in the discharge of his duty to justify the engineer in writing the letter which he did, and which I have already quoted, and proceeding to turn off the water if the official was prevented from placing the meters in the premises.

“But apart from that, I think that the plaintiff is not entitled to

use the water of the City without paying for it, which he is doing when he has prevented the measurement of the quantity he uses, and that the City may turn off the water from these premises. Of course both of these gentlemen will act reasonably. They only want the question settled.

“In my opinion the application to continue the restraining order should be dismissed, the costs of both parties to abide the event.”

On appeal the City was again successful and Drysdale, J. delivered the judgment of the Court:—

“The only question here is what is meant by service pipe in the legislation contained in the consolidated City Charter of 1907 in respect to water meters. It seems reasonably clear that in the matter of supplying water to premises under the provisions of said charter, the term “service pipe” is used to designate the pipe leading from the street main to and through the wall of a house or property for the purpose of supplying the premises to be served with water. When a house abuts on the street the City must put such service pipe through the wall of the house. In cases where the house stands back from the street line, the service pipe is nevertheless to be carried to the house, but the expense beyond the street line, falls on the owner. There are many provisions in the Act dealing with the service pipe, and I conclude, after an examination of the Act, that all of them are consistent with the view that “service pipe” as used in the legislation referred to means the pipe leading from the main through and into the premises to be served with water. Once it is concluded that the service pipe is the pipe leading through the wall and into the premises for the purpose of interior supply, all the provisions of the Act respecting meters, the placing thereof, inspection, examining, reading and the entry of the premises for such purposes is given a place. To adopt the contention of plaintiff’s counsel that the service pipe mentioned in Section 464 of the Act means only the pipe on the street would involve us with a lot of legislation applicable only to a few meters installed under a former statute and with a scheme of legislation whereby it was intended that a special excavation should be made on the street in front of every property abutting the street in order that the meters contemplated by the present Act should be affixed to the service pipe under the street, and in connection with such excavations, permanent traps and underground places kept for

the examination and reading of the meters. This is not, I think, the scheme of legislation as disclosed by the Act.

"I am of opinion the act contemplates a service pipe being led through the wall and into premises to be served with water, and the affixing of the meter on such service pipe inside the premises. So construed, I think effect is given to all the sections, and a reasonable intention indicated by all the clauses when considered as a whole and by individual clauses when taken separately.

"In my opinion, the appeal should be dismissed with costs."

STREETS.

The area of cement concrete sidewalks laid was 7473.64 yards, the length 9073.31 feet, and the cost was from \$1.27 to \$1.86, according to conditions. Included in the sidewalk work there was 1666 feet of straight granite curb, 521 feet of corner granite curb, 2289 feet of straight granite gutter, 562 feet of corner granite gutter, and 6,430 feet of straight combined concrete curb and gutter. The latter cost from \$0.53½ to \$0.90 per foot.

The total length of concrete sidewalks laid is 11.03 miles, distributed as follows:—

Post Office	435.00 feet	
1891	645.00 "	
1892	3344.10 "	
1893	1627.92 "	
1894	1145.17 "	
1895	—	
1896	796.10 "	
1897	302.17 "	
1898	740.50 "	
1899	—	
1900	45.00 "	9080.96 = 1.72 miles
1901	41.00 "	
1902	411.46 "	
1903	763.00 "	
1904	580.96 "	
1905	833.75 "	
1906	4475.89 "	
1907	13267.00 "	
1908	9522.26 "	
1909	10198.47 "	
1910	9073.31 "	49167.10 = 9.31 miles
		58248.06 = 11.03 miles

East of Lockman Street the stone block pavement on North

Street was extended across the entrance to the I. R. C. Station. The total mileage of permanent roadway pavement is now 5.42. In 1900 there was 1.25 miles. A recommendation was made for the paving of Bell Street, between Water Street and Barrington Street, but it did not receive the approval of the Council.

Mr. A. M. Bell was given permission to lay out St. Matthias Street between Chebucto Rd. and Willow St., and the City Engineer was authorized to lay it out on the Official plan.

The City accepted from the North West Arm Land Company, a deed of Inglis St. (75 feet wide), from Robie Street to the western end, Robie Street (75 feet wide) from its south end to Inglis Street, the road from Inglis St. to the Arm, (through Marlborough Wood) 60 feet wide and a small park and boat landing at the Arm at the termination of the last mentioned road. The total length of streets accepted and unaccepted is 100.84 miles.

A narrow strip of land on the east side of Granville Street was purchased from the Nova Scotia Fire Insurance Company, to widen the street to the official line before the erection of a new building.

The City Solicitor and City Engineer were instructed to take the requisite preliminary steps for extending Charles Street from Maynard Street to Gottingen Street.

Building lines were established on Quinpool Road thirty feet back from the street line on the north and east side from Elm St. to Chebucto Road and on the South side from Elm Street to the western boundary of Armdale.

The Council considered a petition for the extension of Poplar Grove or Grafton St. diagonally to Water Street, the opening of a new street diagonally between the City Hall and the head of Jacob Street and the extension of Brunswick St. to Albert St. As our street plan development is on the rectangular or gridiron system rather than on contour lines, the necessity for such streets must become more and more apparent.

The boulevarding at the junction of Coburg Road and Robie St. was begun during the season granite curb and gutter being laid on the north side of the flat iron.

Sections 4, 5, 11 and 17 of the Official Street Plan were completed and sections 4, 5 and 17, were confirmed. Section 11 was sent back for further hearing.

Three more steep blocks were paved (experimentally) with tar filled macadam. On Sackville St. between Granville St. and Hollis St., tar only, was used. Between Granville St. and Barrington St. tar and asphalt were used in equal proportions. On Prince St. between Granville St. and Barrington St., one half barrel of asphalt was added to the tar. As the penetration method used in laying the macadam on Kaye Street did not give satisfactory results, the mixing method was adopted on Sackville St. and Prince St. A three-inch layer of broken stone varying in size from one inch to two and one half inches was thoroughly mixed and coated with bitumen using $1\frac{1}{2}$ gallons to the square yard. After standing from a few hours to a day, according to the temperature of the air, it was rolled down to about two inches in depth. After being allowed to set, the surface was coated with hot bitumen and immediately covered with dry stone screenings, then thoroughly rolled to force the screenings into the surface voids and into the coat of tar.

On Sackville St., below Granville St. licensed cabs stand on each side and confine the traffic to the centre of the roadway. These conditions caused more wear than on the other blocks, yet the result may be pronounced satisfactory and complaints are few.

On the upper blocks no signs of wear are apparent and your officials were congratulating themselves on the success of the experiment when complaints began to come in. Truckmen especially find the roadway slippery at times and very difficult to ascend with a load.

On Prince St. bitumen flushed to the surface during hot days and complaints were made by pedestrians and merchants.

It is evident that further experiments and tests must be made before a satisfactory pavement for these hills can be adopted.

SEWERS AND DRAINS.

Sewers were laid in fifteen streets the total length added being 5,697.58 feet and the average cost per foot \$4.86.

The length of sewers constructed under the sewer Act from 1890

to 1910 inclusive is 149,315 feet or 28.3 miles. In 1900 the length was 20.3 miles.

The Prince St. outlet had been badly damaged by the wash from the Dartmouth Ferry steamers. Substantial repairs were effected and a lease given to G. P. Mitchell and Son at a nominal rental under which they are to be permitted to plank over the top of the outfall sewer and store molasses, &c., on it.

Beazley Bros. having obtained a lease of the water lot between the sewer and the King's Wharf and having no means of access from the land side, it seemed desirable to arrange an exchange of privileges. Accordingly they were allowed access to their lot over the sewer, the City in return to have the right to enter upon their water lot at any time for the purpose of repairing or extending the sewer.

Thirty two new concrete catchpits were constructed making the total 933. In 1900 there were 718.

One hundred and eighty-five permits were issued for laying, cleaning or repairing drains.

The plumbing Inspector reports approval of 457 applications for permission to do plumbing work, and 408 certificates were issued for completion of work.

The Board of Plumbing Examiners held five meetings, eight candidates were examined, four of whom passed and two received permission to work for one year.

314 cubic yards of concrete sewer blocks were made at the City Yard at an average cost of \$8.54 per cubic yard, as shown in detail. in the statement appended.

COBURG ROAD AND OXFORD STREET SEWER.

A petition was received during the year asking for the construction of a sewer on Oxford Street and the western slope of Coburg Road. The designing of a drainage system for these streets involves a study of the whole drainage problem on the western slope of the City—east and West from Walnut St. to the North West Arm and north and south from the H. & S. Ry. in Dutch Village to Oaklands.

Our first study was for the purpose of determining the possibility of discharging the sewage from the western district into the Harbour. While not physically or financially impossible to drain the whole of western slope of the City into the Harbour, the comparative cost would be so great that the adoption of such a scheme would not be justifiable at least for many years to come. Further, the absolute necessity for it is not apparent.

The Engineering staff has been obliged to spend a good deal of time on this question and it has been ascertained beyond doubt that Coburg Road east of Oxford St. and Oxford St. between Quinpool Rd. and South St. with tributary district east of Oxford St. sloping towards the Arm, could be drained through Inglis St. to the Harbour.

In working out this proposal, two schemes were tried out, one to carry the drainage through Atlantic St. to the Ogilvie St. outlet at Steel's Pond, the other to discharge the sewage down Inglis St. through the Esplanade outlet.

In this Inglis St. scheme, it would be necessary eventually to enlarge the sewer on Inglis St. for a length of about 1700 ft. Going down Atlantic St., about 1800 feet of the old sewer would be too small. The estimated cost of discharging at Atlantic St. is \$100,000. The estimated cost of discharging at Inglis St. is \$85,000. The cost would not warrant the adoption of this scheme, because the area that could be drained is only about 150 acres, while the expenditure now of about the same amount for discharge at the Arm, would provide for a district of about 375 acres, which includes about all that would be requiring drainage in the next twenty years.

There are two systems by which the western slope can be drained. One is known as the separate system, the other as the combined system. The combined system is the one adopted on the eastern slope, and carries the water and house sewage together. The construction of the combined system, without any attempt to deal with the house sewage, except by discharging it into the Arm untreated, would be cheaper, but there is already strong opposition to any proposal to discharge raw sewage into the Arm. The discharge of the dry weather flow of raw sewage into the Arm in the usual way, would mean the creation of a nuisance at every street end, and all floating matter carried in the sewage would be deposited along the shore by the prevailing westerly winds. The result would be similar to that

already experienced in the vicinity of the Esplanade, and would be most undesirable and in the opinion of your Engineer, such a proposal should not be entertained.

A preliminary design has been prepared for a combined system to carry the dry weather flow of house sewage to an intercepting sewer running along the shore and discharging at a point in the vicinity of Black Rock, with a provision for overflows at the street ends for the discharge of storm water to reduce the cost of the system.

All the possible locations from North to South in this district have been looked over carefully, resulting in the conclusion that the neighborhood of Black Rock affords more advantages and fewer disadvantages than any other location farther north. Above this point, boating, bathing and the different public landings would be affected. The water is shallower near the shore and the shoals run out farther. At Black Rock, the Arm is at about its narrowest, and consequently the current is greater, the water is deep and the shore bold.

The scheme recommended for adoption includes screening and settling tanks, which would clarify the sewage before discharging it into the Arm, so that there would be no apparent nuisance. It would be necessary to construct one tank only for present requirements. While such tanks can be operated without offence, it is not desirable to place them at any of the street ends on the Arm, where there is so much traffic, and which are the only places at which the public have a right of access to the Arm waters.

The estimated cost of constructing so much of the system as would be required for the immediate future, is \$98,600 and this outlay will provide trunk sewers for the accommodation of all the streets draining to Coburg Road and Oxford Street.

The condition of the Coburg Road and Oxford Street neighborhood is already becoming dangerous. The property owners are using cesspits excavated in the solid rock and the overflow runs in some cases directly to the gutter, thence for a quarter of a mile or more in the open ditch, in others, almost directly to wells. It is unnecessary to emphasize the menace to health contained in such conditions. The drainage system for this district must be constructed in the near future or building operations must be stopped. There has been no sound

argument advanced against the construction, except the financial one. This is a question for the City Council, not the Engineer.

INTERNAL HEALTH

The amount expended in this service was divided generally as follows:—

Cleaning unpaved streets	\$9059.20
" paved "	5500.00
" Catchpits	3116 17
Sprinkling (by contract only)	1994.32
Removal of ashes and garbage	3261.92
Repairs, renewals, supplies, &c.	1454.31

To the above should be added the cost of the work performed by the City teams in scavenging and sprinkling.

The sanitary disposal of the garbage of the City is a matter which must receive the serious consideration of the Council within the next twelve months.

The method of disposition in vogue up to the present is to gather all garbage which would create a nuisance and be a menace to health at the individual residences and haul it to one spot where it is dumped, as a rule, the garbage is dumped at the Exhibition Grounds, but for a month during the exhibition, we are obliged to dump it wherever we can find a hollow in which we can place the material without serious objection from property owners residing in the neighborhood.

The number of places in which the garbage can be deposited is very limited. The hollow at the Exhibition Grounds is rapidly becoming smaller and within a very short time, will be filled up entirely. If the City does not take steps in the near future to provide for some other place or method of disposal, we shall be forced to deposit it on City property, where it will be most offensive and a serious menace to the health of the community.

The disposal of garbage and refuse in a manner conforming to sanitary law, is becoming a matter of vital importance and should receive the immediate attention which so important a factor in the welfare of the City deserves. It is most essential that adequate means be provided for the efficient disposal of all decomposing

refuse including dead animals and night soil. Sanitary authorities agree that the complete destruction of garbage or a complete change in its characteristics is the only solution that will satisfy sanitary requirements.

A visit to a garbage dump will show it to be a breeding place for flies and rats, and offensive and unwholesome odors are carried from it by the wind for long distances. Flies from such places cannot fail to carry disease into any residence they may enter. The danger to public health is further increased by the sorting over of the garbage by men and women who find articles which they consider of value. The fact that these articles have been in contact for hours, perhaps days, with the garbage, together with the fact that the articles are not likely to be free from filth themselves, emphasizes the risk of conveying these cullings back to the City as carriers of dirt and disease germs.

There are only three methods of disposal which give any measure of efficiency,—Dumping at sea, the reduction method, and incineration.

Dumping at sea is not only fully as expensive as burning, but were practiced, is found to be very objectionable even when the garbage is carried twenty miles out to sea, and is being abandoned by all progressive cities where it has been in use.

The reduction method, which consists of passing the garbage only, through a digestive process and taking out its oils and grease, is not popular for the following reasons, namely, that it is expensive to instal, it is practically impossible to carry on the process without causing a nuisance by offensive odors, it deals only with the garbage and some other means must be provided for disposing of the remaining rubbish and refuse.

In the cremation method, two systems are followed, one the low temperature furnace, and two, the high temperature furnace.

In the low temperature furnace, the heat is not sufficient to completely destroy all the organic matter in the mass, and noxious, unburnt gases are produced. In the attempt to overcome this difficulty, coal or other fuel is burned. While the first cost is lower, the annual cost is about the same as in the high temperature furnace.

The City has authority now, (Chap. 62, 1891), to borrow \$12,000

to instal a crematory, but that would not be sufficient even to instal a low temperature furnace. The most satisfactory and up-to-date furnace is the high temperature incinerator. It is generally arranged in the modern plants so that the heat produced may be utilized for steam raising and consequently, power can be obtained for the operation of machinery. The operation is carried on without offence from odors, smoke, dust, or noxious fumes, and the plant can be located in the neighbourhood of residences. Such a plant is in operation in the City of Westmount, Quebec. With Alderman Martin, your Engineer inspected that plant in September last.

A careful study has been made of the latest practice and the incinerator at Westmount seems to be most up-to-date. They raise steam in water tube boilers with the heat produced by the burning of the garbage, They use no fuel in the furnace except the garbage itself and the surplus power obtained is used to assist the operation of an electric lighting plant. In Halifax, the power produced could be used for lighting, running the stone and clinker crusher and for similar purposes.

It is probable that the installation of such a plant as that at Westmount with a capacity of fifty tons in twenty-four hours, would cost \$40,000, but the time is near when the City must grapple with this problem, and I would respectfully recommend that early action be taken to obtain plans, specifications and tenders for the installation of a modern garbage incinerator so that the necessary legislation may be obtained and some more sanitary method of disposal provided by the time the hollow at the Exhibition grounds is filled.

Improvements in the method of street sprinkling and street cleaning are almost solely a question of cost. It means an increase of the annual appropriation of not a few dollars, only, but thousands, to enable the Works Department to do this work as the Civic Improvement League desires. The sprinkling in the suburbs of the City is done by contract, with the exception of one district which is covered by a Works Department cart. These carts are covering as many miles of street as it is possible to water in half a day, but horses could not stand the work if the length of the district were increased. The remainder of the City, including all the business and oldest residential districts, is covered by Fire Department carts. The Board of Fire Commissioners limit the distance, which the horses are allowed to go from the fire stations and consequently the

length of streets sprinkled by the fire carts cannot be increased. The appropriation for this work is limited, therefore the number of hired teams employed cannot be increased.

Street cleaning at night has been suggested as an improvement on the present system. Outside the paved streets, the work could not be as well done in the night; it would cost more and no good practical reason has been suggested for doing it at night instead of in the day time. Under certain conditions, it is better to clean paved streets at night instead of in the daytime, but such conditions do not exist in Halifax. In large cities, it is a practical impossibility to clean thoroughly, paved streets on which there is heavy traffic, during the day time. It is the practice, on such streets, to remove the dirt roughly during the day and give the streets a thorough cleaning at night when there is no traffic on them. The night cleaning is adopted, however, from necessity, and not from choice. In such streets, the roadway is dirty all day long. In Halifax, the paved streets are kept clean during the day, which is the time when cleanliness is needed and not at night.

The cleaning of the unpaved streets is quite as unsatisfactory to the Works Department as to the citizens who are complaining. If there were money enough in the appropriation to clean them twice or more, the streets should be cleaned in a short time, at the first of the season, but as there is money enough to clean the unpaved streets once only, it becomes necessary to leave those streets on which there are no permanent gutters, until June or later, because if they are cleaned earlier, the grass grows in the gutters after the cleaning is done and remains there until the next year, which makes these streets very unsightly. It is, therefore, the practice to do the cleaning after the grass has grown or begun to grow, so that the streets when cleaned once, may be more sightly during the tourist season.

On those streets which are most important, and which are cleaned first, the work is begun as soon as the season opens. This year, the season was very late and no allowance is made by the critics for this obstacle to early cleaning. The cleaning cannot be pushed until the frost is out of the dirt. The sun is shining brightly in some years in the month of February, but the frost is in the dirt for weeks after that date. Cleaning has been commenced as early as the 11th of March, whilst this year it did not begin until late in April.

If the money were provided, the unpaved streets would be kept as satisfactory to the public as the paved streets, but \$1,000 a mile is expended annually in cleaning the paved streets, while the expenditure in cleaning the unpaved streets is only \$74.00 a mile. It is impossible to organize and maintain a \$1,000 service with \$74.00.

PUBLIC BATHS.

The Beach Bath was opened on June 30th, 1910, and closed on Sept. 25th. The number of bathers was—male 5045, female, 695—total, 5740. The expenditure was \$503.08, receipts \$213.10.

CITY PROPERTY.

The plant and supplies of the Water Department were removed to the new shops and blacksmith's, carpenters and painters transferred to their new quarters.

A new building for the road rollers was erected at the south end of the old concrete building.

The north side of the City Hall was pointed in April and all the exterior woodwork afterwards painted.

The old Queen Street fire station property was sold to W. A. Black for \$1200.00.

The Works Department were requested to restore the trusses in the Bedford Row fire station to their original camber. David L. Bell of Shubenacadie an expert in such work was placed in charge and carried out the work successfully and satisfactorily, the total expenditure being \$983.34

Plans and estimates were prepared for public comfort station under the Grand Parade immediately south of City Stable. The plans provided for a double station, one for males and the other for females with the entrances from Barrington St. located as far apart as possible.

Closets, urinals and wash basins would be installed, a number of which are intended to be free to the public, the remainder available on payment of a small fee.

NEW BUILDINGS.			ALTERATIONS, ADDITIONS, &C.		
Month.	No.	Value.	Month.	No.	Value.
May	14	\$ 27,510	May	47	\$ 8,321
June	4	8,300	June	51	13,431
July	13	46,900	July	51	17,786
August	7	6,400	August	48	6,400
September	7	144,700	September	45	3,419
October	11	18,110	October	36	5,805
November	13	21,020	November	28	3,198
December	12	18,970	December	8	1,238
1911.			1911.		
January	5	7,300	January	7	1,265
February	2	4,700	February	9	1,100
March	8	16,600	March	23	3,460
April	5	8,620	April	21	2,485

Violations of the law reported to the City Solicitor during 1910-11:—

Date of Report.	OWNER.	LOCATION.	VIOLATION.
1910.			
May 12	W. W. McKay	37 Seaforth St.	Erecting bldg without permit.
" 12	G. E. E. Nichols, Agt	120 Dresden Row	Building in dangerous condition.
" 20	G. A. Perrier	33 Granville St	Wood addition in brick district.
June 17	W. W. McKay	37 Seaforth St.	Erecting building without permit. (2nd report).
" 17	R. A. Corbin	Oak St.	Erecting building contrary to Building Act.
July 27	E. W. O'Donnell	65 Albemarle St.	Doing more work than permit calls for.
Sept. 14	Mrs. M. Andrews	52S Gottingen St.	Deafening not inspected.
" 14	R. A. Corbin	Oak St	Erecting building contrary to Building Act. (2nd report).
1911.			
Jan. 16	R. F. Osman	166 Quinpool Road.	Erecting stable without permit.
Mar. 3	R. A. Corbin	Oak St.	Erecting building contrary to Building Act. (3rd report).

EXPENDITURE.

The report of the Clerk of Works shows the totals:—

Water Maintenance	\$ 92,530 86
Water Construction	15,648 30
Sewer Construction	37,129 70
Sewer Maintenance	1,433 56
Streets	36,678 92
Sidewalks	23,565 49

Internal Health, Street cleaning, scavenging, &c....	\$18,885	92
Patrol cleaning paved streets.....	5,500	00
Street Lighting	23,703	44
City Hall Lighting	839	92
Teams and Stables.....	7,229	65
City Property	2,673	91
Fire Insurance.....	743	80
Fuel, City Hall	1,176	87
Baths	503	08
Telephones	338	24
Electric Wiring Inspection	399	58
Workshops.....	2,078	58
Parade Walk	444	65
Bedford Row Fire Station.....	983	34
Clearing Private Drains.....	186	18
	<u>\$272,673</u>	<u>99</u>
Decrease in expenditure below 1909	40,865	82
Total Labor Pay Roll.....	119,528	21
Decrease	2,654	36

The total expenditure during the last 10 years is as follows:—

1900	
1901	\$275,238 13
1902	264,428 14
1903	231,634 54
1904	183,467 75
1905	286,663 24
1906	362,244 84
1907	408,912 53
1908	297,009 83
1909	313,539 81

The usual reports and statements are appended.

Respectfully submitted,

F. W. W. DOANE,
City Engineer.

REPORT FOREMAN OF WATER DEPARTMENT.

HALIFAX, N. S., May 1st, 1910.

F. W. W. DOANE, Esq.,
City Engineer.

SIR,—I beg to submit for your information the annual report of stock belonging to the Water Department, mains laid, renewed or cleaned, also service pipes added with location of new buildings supplied with water during the year 1910.

Respectfully submitted,

E. MORRISON,
Foreman Water Department.

New Mains Laid in 1910.

STREET	FROM.	To.	High or Low Service.	CAST IRON MAIN PIPE.					HYDRANTS.				COST PER FOOT IN CENTS						Total Cost.								
				4 in. Pipe--feet.	6 in. Pipe--feet.	9 in. Pipe--feet.	12 in. Pipe--feet.	Joints.	No. of Valves.	Length of Pipe--feet.	Size of Pipe--inches.	Number.	Number of Valves.	Percentage of Rock.	Pipes and Specials.	Valves and Hydrants.	Labor and Cartage.	Lead and Gasket.		Dynamite and Fuse.	Total.						
Agricola	W. Young	Kane	H		540		T.&B.	2												92.1	9.3	53.7	3.0		158.1	853.59	
Belle Air	N. end of pipe	Ontario	H	156			"	1												60.0	12.8	69.0		1.2	143.0	223.08	
Cedar	Henry	108 feet East	H	108			"	1												63.6	80.7	51.0	5.5		200.8	265.06	
Chebucto Rd	West end pipe	W. side Connolly	H	137			"	1	9	6	1	1	100							66.4	72.2	191.9	3.1	9.3	342.9	900.63	
Chestnut	Jubilee Road	305 feet South	H	305			"	1					90							61.6	6.6	163.6	1.1	8.4	241.3	735.96	
Cherry	Louisburg	500 feet East	H	500			"	1												60.1	4.0	31.7	1.4		98.1	490.50	
City Yard	Work Shop	175 feet North	H	175			"	1												45.5	14.5	43.4	1.6		105.0	183.75	
Clifton	Between Cunard and Charles	118 feet North	H	118			"													63.7	69.2	67.9	8.5		206.2	257.75	
"	From N. end of pipe	S. side St. Alban	H	159			"		7	6	1	1	10							62.8	39.1	85.1	1.0	0.9	188.9	331.13	
Duffus	W. end pipe W. of Albert	108 feet West	L	108			"													60.0					124.7	134.67	
Henry	End of pipe	60 ft. S. of Cedar	H	60			"	1												62.8	33.3	100.4	4.4		200.9	120.57	
Jubilee Road	Oxford	260 feet East	H	260			"	1					30							60.0	7.7	69.4	1.7	1.9	140.7	865.62	
"	W. side Chestnut	52 feet East	H	52			"						90							71.0		146.3	4.3	2.0	223.6	116.19	
Kline	S. side Oak	24 feet North	H	24			"	1					100							83.9	83.3	289.0	10.3	7.5	474.0	113.76	
Larch	Coburg Road	290 feet North	H	290			"	1					100							63.4	6.8	187.4	2.1	11.1	270.8	785.32	
Longard Road	Columbus	83 feet North	H	83			"		14	6	1	1	5							63.3	85.6	144.4	3.8		297.1	300.01	
"	W. Young	Macara	H	735			"	2												60.9	5.4	39.7	0.1	0.1	106.2	780.57	
Oak	Kline	72 feet East	H				"													60.0		148.8	1.9		210.7	151.70	
Ontario	End of pipe	Belle Air Terrace	H	72			"													81.3		159.7	8.0		249.0	67.31	
Oxford	Quinpool Road	1834 S. to end of pipe	L	27	1884		"	2	9	6	1	1	90							128.3	8.8	180.9	1.3	8.2	326.6	6182.53	
Pepperell	End of pipe	172 feet East	H	172			"													60.0		70.6	0.4		131.0	225.32	
Preston	Opp. Shirley	12 feet South	H	12			"													89.4		176.2			265.6	81.87	
Stairs	Agricola	252 feet East	H	252			"	1												60.0	7.9	57.0	0.6		125.6	316.26	
Total				176	3890	540	1884		17	74		6	5														

1910-11.

CITY ENGINEER'S REPORT

Street Mains Replaced with Larger Mains, 1910.

LOCATION.			Size inches.		Length in feet.	Cost.
Street.	From	To	Old.	New.		
✓ Duke . . .	Albemarle	Hydrant W side	3	6	25	\$ 69 73
✓ George . . .	"	"	3	6	31	59 66
✓ Morris . . .	Pleasant	South Park	6	12	1906	4483 66
✓ North . . .	Lockman	Brunswick	9	12	375	856 69
Prince . . .	Albemarle	Hydrant W side	3	6	29	58 37

Old Mains Renewed.

✓ Albemarle.	Jacob	Sackville	6	6	1991	\$2728 43
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Total Length of Cast Iron Water Mains in the Water Supply System of the City of Halifax.

	SIZE OF PIPE IN INCHES.											Total length in feet.
	27	24	20	15	12	9	8	6	4	3	Less than 3	
Length at Dec. 31st, 1909	14,560	20,524	6,732	44,236	39,503	48,215	663	156,068	34,945	29,669	898	396,013
Laid during 1910					4,165	540		3,715	175			8,595
Taken up during 1910						375		1,906		85		2,366
Hydrant pipes 1910								105				105
Total 31st Dec., 1910	14,560	20,524	6,732	44,236	43,668	48,380	663	157,982	35,120	29,754	898	402,347

Equal to $76\frac{1067}{280}$ miles

N. B.—Pipe from main to hydrants (except on wharves) laid previous to 1897 not included in above summary.

Pipe Cleaning by Mechanical Scrapers.

DATE.	LOCATION.		Dia. of pipe—in.	Length cleaned in feet.	Cost.	REMARKS.
	From	To				
July 5.	High Service Main	Spruce Hill Lake	Hatch box	20 6712	.....
5..	" "	Hatch box.....	.....	15 Not cleaned	.....	Scraper stuck below Prospect Road.
Sept. 13.	" "	Spruce Hill Lake	Hatch box	20 6712	\$20 95	Recleaned
13.	" "	Hatch box.....	Robie St.	15 29628		

Length of Service Pipe Laid during 1910.

SIZE.	1/2 feet.	3/4 feet.	1 feet.	1 1/2 feet.	3 feet.	Total Length in feet.
New	4761	95	.....	23	20	4899
Renewed.....	3774	131	.....	.....	.....	3905

New Hydrants.

STREET.	LOCATION.	Design.	Service.	Size of Pipe—Inches.	Length of Pipe—Feet.	No. of Nozzle.	Distance Valve from Hydrant.	Cost.
hebucto Rd.	Cor. Connolly	City.	H.	6	9.0	3	5' 2"	\$116.70
lifton	Betwn. Cunard & Charles	"	H.	6	7.0	3	5' 0"	104.33
Clifton	Cor. St. Alban	"	H.	6	1.11	3	.....	86.14
Cedar	Opp. Henry	"	H.	6	24.0	3	6' 3"	110.90
Edward	Cor. Binney	"	H.	6	12.0	3	4' 6"	120.66
Lilac	Cor. Coburg Road	"	H.	6	12.0	3	7' 8"	115.24
Longard Road	Cor. Columbus	"	H.	6	14.0	3	11' 6"	156.72
North	Opp. Railway Station...	"	L.	6	7.0	3	4' 10"	119.45
Oxford.	Cor. Jubilee Road	"	L.	6	9.0	3	5' 6"	149.71