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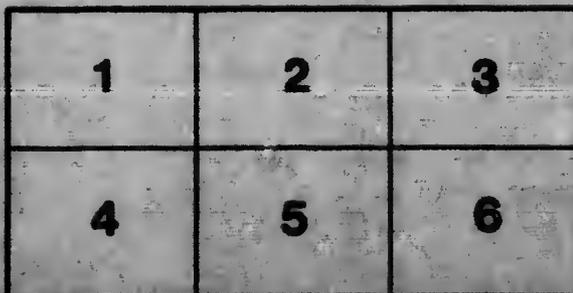
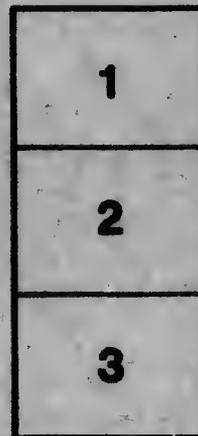
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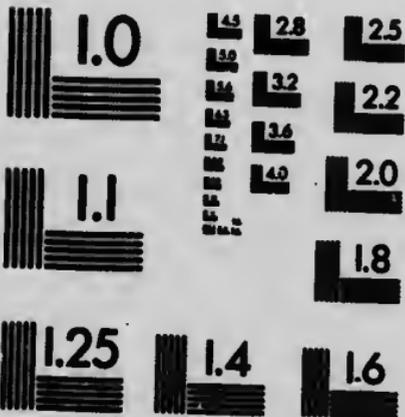
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REPORT ON ELECTRIC AND STEAM RAILWAYS, ALSO THE MARSH AREA, BY W. T. JENNINGS, M.I.C.E.

Toronto, January 7th, 1903.

His Worship, the Mayor of Toronto.

Sir,—I have the honour to submit, through the City Engineer, that portion of my report dealing with "Radial and City Railways," as requested by Council on the 6th of December last.

I have further to state that the report relating to steam railways in and about Toronto, also the report relating to the Marsh area will be submitted at an early date.

I remain, sir,
Yours respectfully,
W. T. JENNINGS, M.I.C.E.

TORONTO, January 6th, 1903.

His Worship, the Mayor of Toronto.

Sir,—On the 4th of December I had the honour to attend a meeting of the Board of Control of the City of Toronto, when the proposed entrance of Suburban Railways to the City, and other transportation matters in and about Toronto, also the disposal of marsh area, were discussed and the resolution of the Council of the 20th October last as follows:

"Moved by Ald. Curry and seconded by Ald. Spence, that this Council is prepared to facilitate the entrance of radial railway lines to this City and to improve local transportation facilities, both for passengers and freight, short of surrendering franchise rights, which it holds should remain vested in the citizens of Toronto; and towards that end the Board of Control is hereby authorized to employ a competent railway engineer to report upon a comprehensive scheme which will meet all the requirements of the Corporation of the City of Toronto, the surrounding municipalities, the Toronto Street Railway, all radial lines now existing or in prospect and the steam railways centering in Toronto, and is instructed to enter into negotiations with the various corporations interested"

was placed in my hands, and I was engaged to report upon the features referred to in said resolution, also upon the arrangement of the "marsh area," with a view to the utilization of that valuable property for commercial purposes.

I beg to say that having perused the resolution and carefully considered the subject in its various features, it is expedient to divide the report into three parts:

- The First*—relating to Electric Suburban Railways and the City Railway.
- The Second*—relating to Steam Railways.
- The Third*—Relating to the marsh area.

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I would respectfully point out that the present publication of the reports does not appear to me altogether judicious, as the City or other parties interested may not be ready to act on recommendations herein offered and thus by premature disclosure of plans, erect against the City and its interests, expensive and troublesome barriers to the speedy completion of such improvements.

It is to be regretted that Toronto has not a charter enabling it to deal with questions likely to arise in connection with the subjects referred to in the above resolution; also for the control of the rural district surrounding the city, parts of which will likely be embraced within the city limits in the near future.

With Respect to Electric Railways.

That part of the resolution in which "the Council is prepared to facilitate the entrance of radial railway lines to this City and to improve local transportation facilities both for passengers and freight short of surrendering franchise rights, which, it holds, should remain vested in the citizens of Toronto," governs the situation from the City standpoint, the other conditional feature being the Toronto Street Railway, now in the hands of a company, under contract with the City for the operation of the system of surface railways within the City limits now, or as may hereafter be extended, during the remaining eighteen years of the franchise term.

It is, therefore, evident that the admission of present or future suburban lines to the City of Toronto during the present tenure of franchise should come about by a joint agreement between the City and the Toronto Railway Company, and the suburban companies interested.

That the parties are agreeable is apparent by the record of negotiations which have been going on to this end.

That such improved conditions are desirable is, I think, unquestioned.

However, it has been stated that such a permit simply means the provision of a right of way in the City for Suburban railways, to enable them to do the utmost amount of business at the least cost, and to no great advantage to the City, as it is supposed, that during the summer months, the Suburban lines, or some of them, will undoubtedly bring large numbers of picnickers through the City to the water front, where they will take steamer for one of the many resorts within easy reach of the City, and that this business will be of no additional advantage to Toronto, as the City already obtains all the actual business or money value to be had from the districts traversed by or tributary to, the Suburban lines, or extensions of them.

This view appears rather narrow, as residents of the adjoining country to the north, east and west are, while not actually residents of the City, yet of it, as their interests largely centre in Toronto, therefore it is a question whether or not they are to be considered as citizens and treated accordingly.

The marked progress of Toronto makes it evident that twenty years hence its limits will cover a largely increased area, the population of which will require additional accommodation in the country side about it; small villages will spring up, and for many miles the country surrounding Toronto will be a well peopled suburb, therefore provision for the entry of these lines should be made on a basis looking as far as possible to such a future.

At the same time it does not appear absolutely necessary to bring all suburban lines to a terminal in the centre of the City for any special advantage that may accrue to the citizens through their being able to proceed to the country without change, or vice versa, as a large number will first require to make use of our City system (now a network covering seven miles in length and two and one-half miles in depth from the lake side), consequently numerous transfers must always result; while for handling light freight and express parcels, both ways, the City is too large for one central depot, such as the St. Lawrence Market, to be generally convenient.

Suburban railway systems having power to extend will doubtless occupy much of the district lying beyond the City limits, hence arrangements made with such companies should be specially guarded to meet future extensions of the area of the City and its railway system.

It is advisable that rights for surface occupation only be permitted, and that the classes of business done be confined to passengers, mail, baggage and light express, also that (under special regulations as to cars and times of service, etc.), they be permitted to carry, from a central station in special cars, such express, packages and light freight as may originate in the City, also to convey farm produce, fruit and light freight originating on their line to a central point of delivery within the City.

As in the case of a steam railway obtaining direct access to the city, or over the lines of another company, and using that company's stations and accommodation, so suburban railway companies whose lines enter the City of Toronto should bear all costs and charges incidental to the construction and maintenance of their works or to their entry (except in the case of subways and bridges for joint City and railway use wherein each company and municipality benefited should bear its share of the cost.) Such company should pay to the City an annual rate per mile for the use of the streets traversed; a rental for stations used and space occupied by sidings and other accommodation; also taxes and other municipal charges, a percentage rate on all passenger (and freight) business done both ways, as is now required of the lessees of the City system.

At the termination of the franchise for the operation of the City railway the City should have the right to purchase the tracks and works of suburban lines built and operated within the then City limits, with the intention of adding these lines to the City system, but they should not be obliged to purchase such lines as the City system now generally covers and should continue to cover in the districts traversed.

Every agreement entered into should terminate at the same time as the lease of the City franchise to the Toronto Railway Company. In the event of the City not purchasing suburban lines as above suggested, provision should be made for a continuation of their service within the City after the expiry of the present contract for the City system, on terms to be arranged (say by arbitration) prior to the expiration of that franchise, and this provision should be so framed as not to depreciate the value of the City system.

Should a suburban railway withdraw from the privileges accorded it by the City, its works, tracks, etc., constructed in or erected on City streets, drives and lands should become the property of the City, and the company thus withdrawing should be obliged to restore to proper condition at its cost the railway portion of pavements occupied.

A schedule of fares based on the present City plan should be adopted, and covering a continuous trip in the City, also to special points beyond its limits, such as York on the east, Mount Pleasant and Mount Hope Cemeteries on the north, Lambton and Weston on the west, and the Humber River on the Lake Shore.

The advisability of permitting transfers between the City and suburban systems is one of policy which should be carefully considered.

The use of City streets by suburban railways proposing to do a freight business, by the car load, within the City limits, should not be considered, as the steam railways surrounding Toronto afford ample accommodation for receiving or handing over such freight on or beyond the confines of the City. Again, very heavy car loads are objectionable, the pavements and track allowances would in time become depressed, consequently repairs and renewals would be expensive, moreover the annoyance due to such traffic is not desirable or necessary, except under peculiar circumstances, which scarcely exist in Toronto.

The cars of each suburban railway taking advantage of the privileges granted in conjunction with the City railway should be operated, handled, loaded and unloaded by the Toronto Railway Company and its employees, and the Toronto Railway Company should be held accountable by the City for the proper conduct of the service, and returns, within the City limits.

The operation of the cars should cause as little inconvenience and disturbance to the residents on the streets traversed or to the general traffic as is compatible with well-laid lines, well-equipped cars in thorough order, and a properly conducted service.

Cars for City and suburban railways should be of a class larger than generally in use on City lines. They should be light, strong and well-finished, as in the case of those used on steam railways. They should be divided into compartments for passengers, baggage, express, etc., and perhaps a smoking-room. The seats should be of the reversible pattern, placed on each side of the central aisle, the car-body should be carried on double trucks of the best design, fitted with heavy axles, and wheels not less than thirty inches diameter, while the tread of the wheels should be broader and the flanges deeper than are ordinarily used on City lines.

On each truck should be hung the most powerful class of electric motor. The cars should be fitted with the latest and most approved pattern of power and hand brakes. In every respect the cars should be of modern design and fully equipped for night and day service.

Cars purely for freight service should be from 18 ft. to 30 ft. in length, strong in frame and trucks, etc., of neat design, with protection for motor-man and conductor, and fully equipped. Short cars may rest on single trucks, while the longer ones should have double trucks, as under passenger coaches.

As the gauge of the Toronto system presents some difficulties, at least presently, so far as one of the suburban lines is concerned, ancient history in this feature may here be referred to. The Toronto railway track originally consisted of a light strap rail with a flat base extending below and in from the flange-way of the car wheel. The upper base was used by the cars, which were drawn by horses, while the lower base was used largely by loaded and light vehicles. Thus the gauge of the system (4'11") was established principally as a convenience for general travel.

On submitting specifications and conditions for the re-letting of the franchise in 1891 the City Engineer explained to the Board of Aldermen that through the improved condition of pavements and a change in gauge of vehicles, the necessity for providing "ways" for general traffic had largely disappeared, and he accordingly recommended that the specifications call for a change of gauge to that of the continental standard, i.e., 4'8½". To this the Board dissented, as their desire was to prevent the transfer of freight cars over city lines, as these cars, being very heavy, would in time depress the pavement and thus cause inconvenience to users of streets, on which the lines were laid, and expense to the City for extra renewals and repairs, etc.

It was, therefore, decided that the system should be renewed on the same gauge.

It will thus be noted that the then City Council were opposed to the use of City streets for freight traffic.

To those not conversant with the business done by the suburban electric railways radiating from the City of Toronto, the following table taken from the pages of "The Railway and Shipping World" for March, 1902, may be of interest.

For the year ending June 30th, 1901:—

Name of Railway.	Mileage.	Gross Earnings.	Net Earnings.
Metropolitan Railway	28.00	\$63,536 43	\$30,318 63
The Toronto and Mimico Railway	5.87	20,050 36	7,958 05
Toronto and Scarboro' E. R.....	5.07	9,850 46	3,145 16
Toronto Suburban S. Railway	7.50	13,001 28	* 545 04
		\$106,438 53	\$40,816 80

* Minus.

With the foregoing features in view it is necessary that the routes selected for the entrance of suburban railways to the City should not interfere with the continuation of the series of belts, squares and parallels upon which the City system is now laid out, nor should they occupy ground which may later on be required for new surface, over or under lines, which the future growth and importance of the City may demand and modern treatment commend.

A plan of Toronto is hereto attached, shewing, in full blue, all the City lines in use, and, in dotted blue, extensions suggested, also in full red, the routes of suburban railways approaching the City, while in dotted red lines are shewn the proposed routes for them within the City limits.

A tracing of Toronto and districts shews in red the extent and direction of each system as built and generally projected.

The suburban lines herein considered are:—

The Toronto and Mimico, on the west.

The Toronto Suburban, on the north-west.

The Metropolitan, on the north.

The Toronto and Scarboro', on the east.

THE TORONTO AND MIMICO RAILWAY

(electric) extends from the crossing of the G. T. Ry. over Queen Street at Sunnyside westward, between the G. T. R. lands and the Lake Shore Road

to the Humber, thence on the lake shore highway through the village of Mimico, past the new Asylum, to the summer resort called Long Branch, a distance of 6.4 miles.

It is stated that this line will be extended at an early date to the Rifle Ranges, Fort Credit, Lorne Park, Oakville, etc., and to a junction with a similar line from Hamilton.

This electric suburban railway is of the ordinary character and of the City gauge (4' 11"). The rails are of the T pattern, 56 pounds per yard, fastened to ties, as in case of a steam railway.

The overhead work is generally of the side bracket description, fastened to cedar poles. The car equipment consists of open, closed and double-deck, single and double truck cars sufficient for present requirements. The electric power used on the line is furnished by the Toronto Railway Company's plant.

Upon the extension of this line westward an important fruit district will be reached, which, together with the summer resort and "outing" business, should add largely to its importance and receipts.

However, the railway being of the same gauge as the City system (4' 11"), it is evident that to do through business with the Hamilton projection one of the sections must be changed. The latter condition is likely to occur in connection with the Toronto end to enable the railway to do a car load business from the fruit district west of Toronto, especially for transfer (outside the City) to the Grand Trunk and Canadian Pacific Railways, en route to the annually increasing markets of Ottawa, Montreal, Quebec, etc.

Should such change of gauge occur it is almost obligatory that a separate right of way and trackage be provided to afford access to the centre of the City of Toronto, without change.

This can be accomplished by departing from the present route near the City limits opposite Grenadiers Pond, where a bridge with ramps will safely pass the line over the Grand Trunk Railway, and, descending opposite Howard Park Hill, reach the general level at the crossing of Howard Park Road.

From the foot of the ramp the track should occupy part of an ample railway and drive allowance to be provided by the City for a southern entrance to High Park, and, later on, for continuation to the Humber River.

The "allowance" should immediately adjoin the northern limit of the Grand Trunk lands, if possible as far as Queen Street near Sunnyside Avenue. If this course cannot be secured, then Indian Road should be used to, say, Pearson Avenue, produced, thence to Sunnyside or Roncesvalles Avenue, where the City lines would diverge north and south to other connections.

The Mimico line might be permitted to use Pearson Avenue and connecting streets from the end of the Park Drive to a crossing of the steam railways near Brock Avenue.

The steam railways here encountered may be passed by a subway, or by a U-shaped ramp and bridge structure over the tracks, and reaching the highway level at, say, the intersection of Brock Avenue and Florence Street.

The route may then be continued by Florence, Dufferin, Alma and Argyle to Lisgar, thence down the latter to Armour Street, and eastward behind the old Asylum wall to and along Defoe Street to Tecumseth Street, and down the latter to Duoro, thence eastward by Duoro and Wellington to Church Street, and from the latter, on the northerly side of Front Street (which is here wide) to the Market Square, where a central depot and station should be provided in connection with the re-arranged market buildings.

Should the gauge of the Mimico Company's line remain the same as that in the City, and pending the completion of some of the required works, the traffic might be temporarily conducted from High Park Drive over the City lines to Lisgar and Queen Streets, thence to the market, as above noted.

The first described route appears most suitable for the purpose, and is least likely to be required in connection with an extension of the City system, either surface, subway or elevated, and it may be made common with the "City and Suburban Railway" from Toronto Junction by a connection at the intersection of Brock Avenue and Florence Street.

It will be noted that it is here proposed to practically connect the Mimico railway with the City system in High Park by a bridge over the steam railways south of Grenadier Pond. As an alternative, the City could continue the proposed south drive in the Park westward to the City limits, and on through Swansea to the Humber River, spanning the latter, and, descending almost to lake level, turn southward and passing the G. T. Railway embankment by a subway reach the Lake Shore at Hlck's Hotel.

The headway in the subway would not be sufficient to meet the requirements of the "Railway Act," but it would be sufficient to pass the highest car now in use on electric railways, and, as brakemen do not often require to take position on top of cars handled by electric railways, this clause in the Act might be interpreted as inapplicable to the cars for this system when for passage through the City. Terms of lease, fares, right of way, percentage of earnings, etc., etc., should all be on the basis referred to under a separate paragraph.

THE CITY AND SUBURBAN RAILWAY,

formerly the High Park and Toronto Railway, now consists of three branches radiating from the Keele Street line, in Toronto Junction, viz., the Lambton

branch extending eastward on the Dundas Road to Humberside Avenue, and westward almost to the Humber River, a distance of about $2\frac{1}{2}$ miles.

The Weston branch, extending from Dundas Street, under the C. P. R. by subway on line of Keele Street, northerly by same route, to the Post Office at extremity of the Village of Weston, a distance of four miles.

The Davenport Road branch, which leaves the Keele Street line at St. Clair Avenue, and passes eastward over the G. T. R. and C. P. R. tracks, on the level, to Weston Road, down which it is laid to Davenport Road, thence it traverses the latter, and, crossing en route the northern line of the G. T. R. on the level, continues to Bathurst, and down the same street for a short distance to the C. P. R. track, where passengers may take the City line. The length of this branch is about three miles.

Short sections of track are laid on Fairview and Humberside Avenues in Toronto Junction, but, being of no commercial value, are not operated. This system, in all, consists of about 10 miles of track. The gauge is the same as that of the Toronto system (4' 11"). The mode of construction, T rails, poles, wiring, etc., are of the ordinary type for electric railways. The cars in use are not as numerous or convenient as on the Mimico line: however, they seem ample for present business.

The electric power used is produced at the company's house, Toronto Junction, and is inadequate for present requirements.

Extensions of the system are mooted, and will doubtless be accomplished later on to Cooksville, Springfield and Streetsville on the west; to Woodbridge and Kleinburg on the north, by Davenport Road on the east, with branches to, say, Poplar Plains Road and northward, as the improvements of the country about St. Clair Avenue will afford.

There is a surmise that the gauge will be changed to 4' 8 $\frac{1}{2}$ " to enable car loads to be handled, outside the City, to and from the steam railways.

The company has charter rights over a section of country capable of affording considerable traffic in the way of passengers, fruit and green groceries.

Should this Company be disposed to reach a common terminus in the City near the market, their line can be extended from its present terminus at the junction of Humberside Avenue and Dundas Street by a new right of way southward to a natural depression, nearly on line of Regent Street, thence eastward by a subway under the lines of the Grand Trunk and Canadian Pacific Railways and Dundas Street, and, returning to the street level opposite the junction of Franklin and Ruskin Avenues; thence continue eastward on Ruskin Avenue to Perth Avenue, along Perth to Wallace, eastward on Wallace, and across the Northern Railway (in the mean-

time on the level), to Marguerita Street, thence down Marguerita Street and Brock Avenue to a junction with the projected route for the Mimico line (at the intersection of Brock Avenue and Florence Street), thence on the track suggested for the Mimico line as before described, namely, Florence Avenue to Dufferin, to Alma and Argyle to Lisgar, Lisgar south to Armour Street, thence east by the back of the Asylum wall to Defoe Street, down Defoe Street to Tecumseth, down Tecumseth to Duoro, thence eastward on Duoro and Wellington to Church Street, and along Front Street to a central depot in the re-arranged Market Square.

In the meantime, a City connection need not be made with the portion of this system terminating at the Canadian Pacific Railway on Bathurst Street, as later circumstances may first require its continuation to a common junction point with other lines, which it is suggested should be formed near the crossing of the Davenport Road and the Canadian Pacific Railway.

Should it be found advisable in the future to afford access to this or any other line from the northward, between Poplar Plains Road and Carlton Street, as later circumstances may first require its continuation to a common junction point with other lines, which it is suggested should be formed near the crossing of the Davenport Road and the Canadian Pacific Railway, safe provision can be made by bridge and ramp (from the Davenport Road over the Canadian Pacific) descending to the street level on the south; or by a subway near Poplar Plains Road.

The Regent Street subway referred to, for the passage of this Company's lines, the City lines and for vehicles, under the steam railways and Dundas Street, should be constructed at an early date, jointly between the City, Toronto Junction and the steam and electric railway companies interested. The site is the most favorable one between Toronto Junction and Dundas Street, and is now unobstructed.

THE METROPOLITAN RAILWAY.

By far the most important of the suburban lines radiating from Toronto is the Metropolitan Railway, which extends northward on Yonge Street from the crossing of the Canadian Pacific Railway, North Toronto, through the villages of Davisville, York Mills, Thornhill, Richmond Hill, Bond Lake, Oak Ridges and Aurora to the town of Newmarket, a distance of about 30 miles. From near Bond Lake, a 16-mile branch extends in a north-westerly direction to the village of Schomberg, whence it is projected to reach the village of Beeton, some six miles beyond.

It is also contemplated to extend from Newmarket along the south and east sides of Lake Simcoe to Roach's Point. In all the railway with its branches will likely total a length of 100 miles.

The gauge (originally 4' 11") is 4' 8½", or similar to that of standard steam railways. Thus it is the only suburban electric railway radiating from Toronto with a gauge differing from that of the City lines.

In location, the main line is situated on Yonge Street almost to Newmarket. The only divergences to private right of way being south of Aurora, where the Northern Division of the G. T. R. is crossed by a steel bridge structure, and from Mulock's Corners to Newmarket, where distance is saved by passing diagonally through a block of farm lands.

The Schomberg branch is built entirely on private right of way extending through farm country; en route it crosses the same division of the G. T. R. on the level, which is an unfortunate feature.

In construction the line is generally of the ordinary suburban character, laid with 56-pound T rails, jointed, bonded and fastened to ties bedded in and supported by broken stone or gravel ballast.

The trolley wire is suspended from brackets fastened to cedar poles, while ordinary and high voltage feed wires are supported on properly formed insulators and brackets fastened to the same poles.

The main power-house is situated at Bond Lake, about midway between Toronto and Newmarket.

Here high voltage current is sent south to York Mills sub-station, where it is converted for use on the adjacent part of the railway where steep grades are numerous.

The passenger cars in use are of the ordinary closed street railway type, while those for freight are plain, closed and generally supported on single trucks.

Improved cars with reversible seats, etc., are, it is said, being prepared for use in the coming season's business.

It is evident that a system of such mileage, passing through a well-peopled and well-farmed country, should do a very considerable business, and that a reasonably large number of cars will be in service on the road daily, consequently it is to be expected that a large traffic, on the streets used, will ensue, while during the summer months picnic and excursion business will doubtless greatly increase its traffic, hence it is obvious that the route determined upon through the City, while affording connection with the City lines, should be almost if not entirely separate from them. Therefore, it is suggested that the route for this system to the St. Lawrence Market be as follows: From the present terminus on Yonge Street, westward on Cottingham to Rathnelly Avenue, thence through the Water Works property, across McPherson Avenue, and under the Canadian Pacific Railway and Dupont Street by a subway, situated east of the Poplar Plains Road; thence by Bedford and Davenport Roads to Yonge Street, across Yonge Street to Severn Street, and along the side hill at the back of the properties on the north side of Collier Street, thence across Park Road, and, rounding the side hill, south-

ward to a short street west of the late Sir Frank Smith's residence, thence by double rails on Bloor Street to Church Street (or, turning from the side-hill to Park Road up Park Road to Bismarck Avenue, easterly on Bismarck Avenue to the west side of the Heward property, thence to Church Street), continuing down Church Street with a double line of rails (owing to difference in gauge) to Maitland Street, thence eastward on Maitland Street to and down McMillan Avenue and North Mutual Street to Shuter Street, thence to and down Jarvis to the St. Lawrence Market Square and Front Street.

Should it be desirable to afford this Company still further facilities for a passenger business in conjunction with the steam railways, the line may be extended along Front and Wellington Streets to a point opposite the west side of the main entrance to the Union Station, thence by private right of way to the north side of Front Street, opposite the Union Station.

It is pointed out that extension to the Union Station would be of special convenience to residents on Yonge Street, and to others from more distant points summering along the route of this line or about Lake Simcoe.

The advisability of permitting the railway to do a through business by means of the streets of Toronto is a matter of policy on which the Aldermen should pronounce an opinion.

The advisability of permitting this railway to reach the wharf front for summer business is also a question of policy, and, should the Railway Company desire and the City Council permit, access may be had by a bridge over the railway tracks along the line of Jarvis or West Market Street, where there is ample room for a ramp to descend to wharf level before reaching Lake Street, which, according to the Esplanade agreement, must soon be completed.

The charter of the Metropolitan permits the carriage of freight over its lines, and it seems reasonable that this privilege should, under proper regulations, be temporarily granted by the City, through the short distance of City property north of the Canadian Pacific Railway, provided the Metropolitan Company obtains right of way and builds a line for the purpose.

It is, therefore, suggested that the temporary route for a freight line be from a suitable point on the north side of the Canadian Pacific Railway between Ruthnelly Avenue and Yonge Street, thence by Cottingham Street, and northward by private right of way (say, on or adjoining the easterly limit of the late Senator McDonald's estate) to the north of St. Clair Avenue, and eastward to a junction with their Yonge Street line at or near Mount Pleasant Cemetery.

It is here pointed out that a permanent freight connection can easily be made with the Grand Trunk Railway Company's "belt line" near Yonge Street and north of Mount Pleasant Cemetery, that by the construction of

a short and inexpensive section of track the Canadian Pacific Railway may be united with the same line near Cudmore's Road, and thence by track privileges, reach the Metropolitan Railway on Yonge Street; or the Metropolitan Railway Company might be permitted by the Grand Trunk Company to operate on this unused portion of their "belt line" as far as the Canadian Pacific Railway at Cudmore's. It is therefore suggested that the railway companies interested arrange for the transfer of freight by this connection.

THE TORONTO AND SCARBORO' ELECTRIC RAILWAY

This railway extends from Queen Street East, Toronto, along the Kingston Road through the Village of Little York to a point opposite Scarboro' Junction, where the Midland and Grand Trunk Railway tracks diverge.

There is also a short branch line extending through the Village of York to the railway depot.

In all, the system consists of about six miles of railway line.

The plan of construction, the (56-lb.) T rails, poles, wires, cars and motors are of the ordinary City type. The gauge is that of the City railway, viz., 4' 11".

The electric energy used on the line is transmitted from the power house of the Toronto Railway Company by separate cables strung on the side poles of the City system.

The company has power to extend in a northerly direction towards Agincourt and Markham, and easterly along the Kingston Road, and it is hoped that the cultivated state of the country and other important interests necessary to success will warrant such extensions at an early date.

In the meantime, it does not appear necessary to afford this suburban railway a separate entrance to the centre of Toronto, but, as improved conditions may, at a later date, make a separate route into the City necessary this can be accomplished as follows:—

By widening Queen Street on either side, between the commencement of the Kingston Road at Queen Street and Eastern Avenue, a distance of, say, 750 feet, and placing a separate track thereon, thence along Eastern Avenue, westward and over the Don River to Water Street, down Water Street to Front Street and along the latter to Princess Street, up Princess Street to Duke Street, along Duke Street to Jarvis Street, thence (on second set of rails, if the gauge is not changed) down Jarvis Street to a central depot at the St. Lawrence Market Square.

As the general course of this line is about parallel to the G. T. R. It is not now apparent that an extension to the Union Station is necessary;

however, should circumstances so require, the route from the market as suggested for the Metropolitan and Mimico lines would be available.

Under proper conditions there should be no objection to the cars of this company temporarily reaching the Market by City lines, but no fixed agreement should be entertained except upon the route above outlined.

OTHER PROSPECTIVE SUBURBAN RAILWAYS.

As the unused Grand Trunk Railway Belt lines from Swansea, on the lake side, to Toronto Junction, and from Fairbank on the Northern Division eastward to Yonge Street, and thence down the Don valley to the City front may again be opened up. It seems reasonable that, with such an occurrence, an arrangement be made for an electric transfer service in connection with the suburban lines, steam railways, and the City system.

The only sections of country apparently unoccupied lie to the north of the City between Yonge Street and the Northern Railway, and, on the east of the Don River, to and for a short distance beyond the village of Todmorden.

The former district will doubtless be accommodated by the Metropolitan and Toronto Suburban Railways, while the latter should be served by an extension of the Toronto system.

From the foregoing it is evident that the country around Toronto is now fairly occupied by suburban railways, whose extension will presumably only occur when and where a commensurate return is assured, therefore, it seems well not to enter the field of speculation as to future possibilities in this respect. Suffice it to say that with access to the City, these lines will doubtless take advantage of every circumstance likely to increase their net receipts, while the City of Toronto, not having power to move in the matter beyond its limits, can only assist in the manner suggested.

THE TORONTO RAILWAY.

Of the Toronto Railway it seems unnecessary to make reference in this report beyond mentioning that the system when taken over by the present company in 1891, consisted of about 69 miles of track, operated by horse-power, and showing a gross income of some \$800,000 per annum.

In 1892 the system was changed to meet modern requirements, and it is now operated by electricity on the overhead wire and trolley plan.

The present length of track is 90 miles, while the gross earnings for 1902 will likely reach \$1,830,000, or an increase of nearly 130 per cent. since the commencement of the term of franchise; which has yet 18 years to run.

The annual reports of the City Engineer set forth the advancement in mileage, construction work, rolling-stock and other particulars of operation, and the City Treasurer's reports refer to the monetary feature, including amount of annual revenue received by the City in return for the franchise privileges.

EXTENSIONS.

The chief features, in the way of prospective extensions, may here be pointed out, but as some of the projections extend beyond the present City limits it is evident that the City area must be enlarged or an arrangement made with the Township of York which will enable these districts to be served by the City system.

The enlargement of the Toronto Railway system will doubtless be continued as the population of the City increases and present sparsely settled districts are built up.

The following routes for immediate, and future extension, are hereunder suggested :

Extend the Gerrard Street line to Coxwell Avenue, Gerrard Street east and Woodbine Avenue, and down the latter to Queen Street; from Woodbine Avenue on Gerrard Street to west limit of East Toronto, and over the Grand Trunk Railway by bridge and north to Danforth Avenue; thence west on the latter to Broadview Avenue.

North on Don Mills Road to Todmorden and east to Pape Avenue, down the latter to the G. T. Railway; thence to Carlaw Avenue subway, and south to Queen Street. A line from Danforth Avenue to Gerrard Street, and on Leslie or Greenwood Avenue to Queen Street, and passing under the G. T. Railway by subway at a suitable point.

From Danforth and Broadview southward under the C. P. Railway, and across the Don River by a new bridge to Amelia Street, thence on Winchester Street to Sumach Street; and down Sumach Street to Queen Street.

A line on Parliament Street from Winchester to Howard and along the latter to Sherbourne Street.

An enlargement of the loop from Sherbourne Street and Elm Avenue, eastward in Rosedale.

The Elm Avenue line should be continued northward across Glen Road Bridge (which should be renewed in a substantial manner and of a like design to the structure at the head of Sherbourne Street) to Binscarth Road in North Rosedale (a suburb which should, by the advantages enjoyed, now form part of Toronto), west on Binscarth Road and up McLennan Avenue to the north-

ern limit of the Lacrosse Grounds, thence west across the Reservoir Park ravine by a bridge (which may be largely built of material removed from the present one on Glen Road when that structure is renewed), about on line of Ormsby Street produced, and south to McPherson Avenue, thence west to a connection with the Dupont Street line.

A branch from the last named route northerly by way of Rosedale ravine, under the C. P. Railway bridge east of Summerhill Avenue, and reaching the latter street by a heavy cutting, thence continuing westward by Walker Avenue produced to Avenue Road, and Cottingham Street to proposed subway east of Poplar Plains Road, with approaches from Dupont Street and Bedford Road on the south.

A line southerly from McPherson Avenue to Bloor Street, say, by Park Road.

The district of Moore Park beyond the C. P. Railway tracks in North Rosedale may be reached by a bridge, say, on line of McLennan Street before referred to.

If the City obtains permission for its lines to cross the C. P. Railway on the level, at Yonge Street and at Avenue Road, an arrangement should be made with the Metropolitan Company for trackage and operation on Yonge Street to Mt. Pleasant Cemetery, also that the Avenue Road line be extended to Upper Canada College, thence easterly to Mt. Pleasant Cemetery and returning by Yonge Street and vice versa. This route would doubtless afford greater conveniences to citizens desiring to reach Upper Canada College or the cemetery than by taking the Metropolitan Railway.

The proposed subway under the Canadian Pacific Railway and Dupont Street near Poplar Plains Road should be arranged for at once and completed as soon as possible, as the double tracking of the Canadian Pacific evidently means additional train service over that line, therefore the dangers of a level crossing should, where practicable, be avoided.

Continue Spadina Avenue line to Bernard Avenue, thence to Walmer Road and north to Dupont.

A bridge over the Canadian Pacific Railway about on line of Kendal Avenue or Walmer Road will afford safe communication with the highlands beyond Davenport Road.

Extend the Dupont Street line westward to Lansdowne Avenue.

A line from Dupont Street to College Street by Christie, Bloor and Sully Streets.

The Arthur Street line should be extended eastward from Bathurst Street, by way of St. Patrick Street, to McCaul Street, thence by Agnes Street and Wilton Avenue to Sumach Street.

A relief line on Richmond Street from Church Street to Bay Street and up Teravlay to College Street and west.

Extend Bathurst Street line south to the Western Harbour entrance at the Queen's Wharf for summer traffic.

On the completion of Lansdowne Avenue subway, the railway should be extended south from Bloor Street to Queen Street, thence by Close Avenue to Springhurst Avenue and east to Dufferin Street at entrance to Exhibition grounds.

A line should be extended up Roncesvalles Avenue from Queen Street to a junction with the Dundas Road line.

A route from Roncesvalles Avenue say, on Marlon or Pearson Street produced into High Park.

A loop from York Street bridge along Lake Street, and back to Front Street by bridge over the railways on line of Yonge Street.

The Council may be reminded that it is about 12 years since an attempt was made to reach High Park from Queen Street west by a southern entrance free from the dangers incidental to crossing the Grand Trunk Railway on the level at two points. Obstacles, however, arose which prevented the plan from being carried out.

It is apparently time that this connection be made and, if it cannot be reasonably and economically carried out on the original projection to the north of the Grand Trunk Railway, it is recommended that the route be from Queen Street by Roncesvalles Avenue as far as say Marlon Street or Pearson Avenue, thence through private lands to Indian Road, thence to and along the southern margin of the Park to the City limits at Grenadier Pond.

The allowance for this "drive" should be of ample width and sufficient to provide for the city railways and the Toronto and Mimico Electrical Railway, also space for carriages, boulevards and foot walks. Indeed it should be made a beautiful feature in connection with Howard High Park.

It is suggested that authority be obtained, if necessary, from the Legislature for the continuation of the proposed drive to the Humber River, with the additional object of serving the area between the present western City limits and the Humber River, at least as far north as Bloor Street, and east to the proposed Regent Street subway, as that district will doubtless ere long form part of the City of Toronto.

Should circumstances warrant the extension of the proposed driveway further west, it can be carried across the Humber River by bridge and, by subway (such as that at Carlaw Avenue), under the Grand Trunk Railway tracks to a junction with the Lake Shore Road near Hicks Hotel.

The proposed Regent Street subway under the steam railway lines would largely do away with the necessity for a level, high or under crossing of these railways on Bloor Street which is situated about midway between the Dundas Street bridges and Regent Street.

The proposed Esplanade and driveway from Sunnyside along the lake shore past Parkdale and the new Garrison, thence over the Common to and through the Old Fort and, by Bathurst Street bridge, to Front Street, is not now considered, beyond the hope that when the City is able to afford this feature it will be carried out in a first-class manner, and that it will not be necessary to extend car tracks upon it.

SECOND SECTION OF REPORT:

RELATING TO STEAM RAILWAY LINES IN AND ABOUT TORONTO.

On examination of a map of Toronto it will be noticed that the City is almost doubly encircled by the lines of the Grand Trunk and Canadian Pacific Railways.

The Grand Trunk double track railway from Niagara Falls, etc., enters the City from the west by the lake shore at Humber Bay, while the Main and Northern lines find access from the north-west and north, over a right of way common to both, almost from the Dundas Street bridges to the Union Station and Esplanade Street.

From the east, the lines of the same system descend gradually along the sloping ground west of the Village of York, cross Queen Street and Eastern Avenue on the level, pass over the Don River and continue (on their own lands) to Berkeley Street, thence on the Esplanade Street strip to the Union Station.

From the Southern Division line, at Swansea, on the Humber Bay, a branch or "loop" extends northward across Dundas Street and the Canadian Pacific Railway line to Detroit, etc., thence northerly across St. Clair Avenue, where it curves to the east and continues to the Grand Trunk Railway main line, immediately to the north of Toronto Junction. This branch or part of a "belt" was built about ten years ago and, after a few months' operation, being found of no commercial value, was closed.

A second branch or "belt" starting from the same company's Northern line, at Fairbank Junction, near Eglinton Road, extends eastwards through farm lands to Yonge Street, thence it continues for a short distance to a ravine at the back of Mount Pleasant Cemetery, where it curves to the southward and, following the course of the ravine and under the Canadian Pacific Railway, emerges in the valley of the River Don to the east of Rose Dale. Its course hence lies along the right side of the valley to Winchester

Street, where it enters the Don Improvement Railway strip and continues thereon to a junction with the main line at the Grand Trunk Railway Don Station.

This part of a "belt" system was also constructed some ten years ago and, very shortly after, almost suffered the same fate at the Swansea "loop;" and it is now only operated for about two miles in the Don Valley.

To form these "loops" into a complete "belt" around the City, in conjunction with the Grand Trunk Railway, a section $1\frac{1}{2}$ miles in length, from Toronto Junction to Fairbank, is all that remains to be done, and it is hoped that the time will soon come for complete reopening as a transfer route for freight cars, and for an electric passenger business in connection with the City system of street railways.

The heavy gradient encountered on the Grand Trunk Railway between Toronto and Scarboro Heights is an expensive feature in the operation of that company's through line, and an annoyance to residents of the East end of the city, by reason of the noise, vibration, smoke and coal dust thereby occasioned.

Possibly, these adverse features may be overcome by a level route from the Don River, Toronto, via the "marsh" and lake shore to Port Union, a distance of some 14 miles, but such a change would only improve the working of main line traffic, as the Midland Railway (branch to Lindsay) leaves the Grand Trunk Railway on Scarboro Heights about nine miles from the Union Station; however, this adverse feature may be met by the Midland Railway trains securing trackage over the Canadian Pacific Railway between Agincourt and the Don Station.

Again, if the Grand Trunk Railway continues over Scarboro Heights, its tracks along the City front and on to York can be relieved of through freight trains by the construction of a short link from York Station westward to a junction with the Canadian Pacific Railway at or near Leaside, thence by trackage westward to Toronto Junction (thus reaching the Main and Northern lines), and further by continuing to the Humber at Lambton, and by a short branch connect with their Southern Division near Mimico.

Such a route, by the rear of the City, would greatly relieve the Esplanade tracks and considerably reduce the cost of train operation between Toronto and Scarboro.

The Canadian Pacific Railway system lying to the west and northwest of Toronto consists of the Credit Valley line, from London and Detroit, and the Toronto, Grey and Bruce line from Owen Sound. They converge at Toronto Junction, whence the direct route to the east continues along the northern City limits to Leaside Junction on the Don Heights, while the Toronto terminal is reached by tracks situated in close proximity to those

of the Grand Trunk Railway as far as the Union Station, and thence eastward, on a company right of way, outside the Esplanade railway strip, to Parliament Street, where the Grand Trunk Railway is crossed and a course north of Mill Street taken to the Don Improvement, upon which it continues to Winchester Street, where it crosses the Don River and commences the ascent to Leaside Junction, and there joins the through route to Montreal.

Thus a complete Canadian Pacific Railway belt is formed around the City.

The Canadian Pacific Railway system has trackage over the Grand Trunk Railway to Hamilton, where connection is made with the Michigan Central Railway for Buffalo, the Falls, and New York, etc., and westward to Brantford.

The raising of the Grand Trunk line from the Humber River to Sunnyside, or only a sufficient part of it, to permit an under crossing of Queen Street at Sunnyside, and the depression of the same company's line through South Parkdale would permit a reduction in the number of dangerous highway level crossings, add to the comfort of residents and improve the capacity of the railway in that quarter.

The opening up of a road and driveway from Roncesvalles Avenue or Sunnyside Avenue through the Park north of the Grand Trunk, to and across the Humber River and under that railway (by a subway) to the Lake Shore Road at Hicks' Hotel, would permit the closing of level crossings at Indian Road, entrance to High Park, Swansea and Jane Street, also reduce travel over the present level railway crossing on Queen Street. Again a high railway embankment between the Humber and Sunnyside would enable under crossings to be constructed; also a trestle opening in front of High Park proper. However, the method of treatment for the highway crossings and the railway lines between South Parkdale and the Humber River can only be satisfactorily decided upon after the necessary surveys and estimates have been made.

That portion of the City lying to the northwest including Toronto Junction may be provided with a safe crossing, by Subway, under the railways and Dundas Street, about on the line of Regent Street and Ruskin Avenue; while a subway under the Northern Railway, in continuation of the last described, would make entrance and exit thoroughly secure in that locality.

The proposed Subway under the railway tracks on line of Lansdowne Avenue should be carried to completion at an early date for the accommodation of the district in which it is situated.

When the Garrison Common becomes a hive of industry it will doubtless be found necessary to erect a bridge over the railways on line of Strachan Avenue.

The City front, particularly near Yonge Street, requires immediate attention, as the ever increasing amount of railway business on the Esplanade correspondingly increases the danger to the vast throngs seeking a crossing, to or from the steamboat landings, during the summer months.

A bridge is, therefore, urgently required on the line of Yonge Street from Front Street southward. It should be of first-class design and suitable for all highway and street railway purposes; also for foot passengers.

On the completion of Lake Street a bridge should be built over the railway tracks on line of Jarvis Street, from Front Street, with its southern ramp descending to the Esplanade level near the street first mentioned.

The opening of the "marsh" area and the deviation of the Don river should be supplemented by the continuation of Lake Street from Parliament to Trinity Street, as it is likely that works established on this area will have business intercourse with other concerns on the Esplanade, therefore a direct road for heavy teaming is a necessary feature.

A bridge over the railways, on line of Parliament Street, from Front Street to the south of Lake Street, with descending ramps will afford secure access to this district from the north.

The extension of the Don improvement south of the Grand Trunk Railway will, under present conditions, require level crossings on that railway, at the ends of its Don bridge.

Without very considerable expense highway crossings cannot be had, above or below rail level, at Queen Street east, and at Eastern Avenue; while the raising of the Grand Trunk Railway from Parliament Street to, say, Carlaw Avenue, would, while affording under highway crossings, be a costly feature, and give only incomplete relief, as the Grand Trunk Company would doubtless retain surface yard and shunting tracks.

Between Carlaw Avenue and York there are a number of suitable places for subways under the Grand Trunk Railway, which can be utilized when the importance of the district demands their construction.

On the line of the Canadian Pacific Railway from Toronto Junction to Poplar Plains Road, the flat nature of the country and want of deep drainage will, it is feared, make subways impracticable unless by super-elevation of the railway tracks, while to depress the railway, in cutting, will necessitate bridges over it, and either plan reasonably precludes the extension of side tracks to yards and factories in the locality. A thorough survey and estimate of this section should be made at once with a view to betterment of present crossing conditions.

The level railway crossing over the Canadian Pacific Railway at the junction of Davenport and Poplar Plains Road should be changed to a Sub-

way (to the east of the present crossing in the valley of the creek) under the railway tracks and Dupont Street, with inclines opening to Bedford Road on the south, Ratfinely on the east, Poplar Plains on the north and Davenport (diverted through the Nordheimer property) on the west.

Yonge Street and Avenue Road are not now adapted for subways under the Canadian Pacific Railway, owing to the compactly built up nature of the abutting lands, but being near the Yonge Street Station of the Canadian Pacific Railway, at which all trains slow up or stop, they may in the meantime be most reasonably guarded by signals, gates and watchmen.

Reservoir Park ravine, a short distance east of Yonge Street, affords a fine site for an undercrossing of the Canadian Pacific Railway, and for a driveway, connecting Summerhill Avenue on the north and Macpherson Avenue on the south.

From North Rosedale a bridge over the Canadian Pacific Railway would open up Moore Park; while at the Canadian Pacific Railway bridge over Mount Pleasant ravine (through which the Grand Trunk belt line extends) an undercrossing and a bridge over the belt line may be had for highway purposes.

Cudmore Road, immediately to the east of the last point, may be carried over the railway by a bridge, and continued by ramp, to a junction with the Todmorden Road, which may be passed by a subway under the Canadian Pacific Railway (Don branch).

Should circumstances demand another roadway on the Upper Don Flats, provision has been made for its passage under the Canadian Pacific Railway steel viaduct near Taylor's brick yards.

A new bridge over the Don River at the junction of Mill Road and Winchester Street would make this crossing point secure and enable the present unsightly relic, and approaches, to be done away with.

It is to be regretted that the bridge over the Don River on line of Queen Street was not at once constructed at a sufficient level to permit the under passage of trains on the Don Improvement.

While trackage and yard accommodation for the Grand Trunk and Canadian Pacific Railways in and about Toronto is, generally speaking, about adequate for present purposes it is evident that enlargement and changes for the convenient and safe conduct of passenger and freight service must soon be considered in addition to those suggested in the foregoing notes.

It therefore seems incumbent upon the City to look ahead and see that so far as in it lies provision is made for the future, especially with a view to the possible advent of new railway lines. With this object it is advisable

to keep the following features in view and, in concert with the railway companies, secure their accomplishment.

The removal of through freight traffic from the front of the City, by construction and operation of the before mentioned route at the back of the City;

The construction of subways under, and bridges over the railways;

The more thorough protection of level crossings;

The provision of an ample railway right of way adjoining the northerly line of the proposed Ashhridge's Channel from the eastern City limits to Cherry Street.

A strip of land, for railway and highway purposes, between Cherry and Berkeley Streets.

The reservation of an ample strip of property for railway purposes to the south of Lake Street, from Parliament Street to the westerly limit of the Waterworks lot near John Street; thence for road and railway purposes to Brock Street and westerly to a junction with the present highway and railway lines at Bathurst Street;

The doubling of the tracks of the Canadian Pacific and Grand Trunk Railways between Parkdale and Toronto Junction, and the like treatment of the Canadian Pacific Company's tracks eastward on the northern margin of the City from Toronto Junction to Leaside;

The reservation of a suitable area between Yonge Street and Simcoe Streets south of the Esplanade for railway, freight and yard purposes;

The gradual filling in of the City water lots for City purposes;

Provision for yard and siding accommodation in the marsh area east of Parliament Street;

The diversion of the Don Channel and the formation of the Don Improvement southward from the Grand Trunk hridge, also the closing of the present channel from the same point to the west side of Parnament Street produced;

The completion of the Don Improvement from Winchester Street to the northern boundary of the City in the Don Valley, and the reservation of railway strips thereon;

The treatment of Toronto Island in so far as railway facilities are concerned will be dealt with in connection with the succeeding Report on the Marsh and when a plan is decided upon.

HIGHWAY CROSSINGS OVER RAILWAY LINES.

On the operated lines of steam railways in and about Toronto there are 105 crossings of which only 22 can be called absolutely safe, while 34 are provided with gates or watchmen and 49 are unguarded.

Of the safe crossings six are by subways under the railways, viz:

Keele Street, Toronto Junction—Canadian Pacific Railway.
 Queen Street, Toronto—common to both railways.
 King Street West, Toronto—common to both railways.
 Carlaw Avenue, Toronto—Grand Trunk Railway.
 Winchester Street, Toronto—Canadian Pacific Railway.
 Amelia Street, Belt Line East—Grand Trunk Railway.

And nine by highway bridges over the railways, as follows:

Weston Road, Toronto Junction—Canadian Pacific Railway.
 Dundas Street, Toronto (double)—common to both railways.
 Gerrard Street, over Don Valley—common to both railways.
 Daves Road, York—Grand Trunk Railway.
 Strachan Avenue, Toronto—Grand Trunk Railway.
 Bathurst Street, Toronto—common to both railways.
 Brock Street, Toronto—common to both railways.
 John Street, Toronto—common to both railways.
 York Street, Toronto—common to both railways.

All level crossings are a source of danger to the public and to the working of the railways and, unfortunately, at times they are the scene of accidents with loss of life and property, therefore, it is incumbent upon the City, County, and Railway Companies to carefully study the question, then meet, discuss and formulate a plan for their elimination or improvement.

On main lines routes of travel, so far as circumstances warrant, bridges over, or subways under, the tracks, should be constructed, while at points where such cannot well be carried out, watchmen, gates, lights and automatic gongs, should be in constant use.

At less important points where the travel is generally large during the daylight hours, day watchmen, gates, gongs and signals should be provided, while for the night hours danger lights and automatic electric gongs, (such as the Hall system) should be operated.

At all other crossing points in or near a large City automatic gongs and signals should be in constant use.

The following list sets forth the position and character of each crossing in and about Toronto, also whether protected or unprotected.

CANADIAN PACIFIC RAILWAY CO.

ONTARIO DIVISION.

List of Road Crossings in and about the City of Toronto.

Name of Crossing.	Unprotected.	Protected by.
Main line via Union Station—		
Cudmore's Road	Unprotected	
Winchester Street		Subway.
Gerrard Street		Overhead bridge.
East Queen Street		Gates.
Easterr Avenue		Gates and watchman.
Front Street	Unprotected	
Vine Street	"	
Water Street	"	
Cherry Street	"	
Trinity Street		Gates and watchman.
Mill Street	Unprotected	
Parliament Street	"	
Yonge Street		Watchman.
Bay Street		Gates and watchman.
York Street		Overhead bridge.
John Street		"
Spadina Avenue	Unprotected	
Bathurst Street		"
Strachan Avenue		Gates and watchman.
King Street		Subway.
Queen Street		"
Brock Avenue		Gates and subway.
Dundas Street		Overhead bridge.
Bloor Street		Gates and watchman.
Royce Avenue (Private Crossing)	Unprotected	
Weston Road		Overhead bridge.
Keele Street		Subway.
North Toronto Branch—		
Cudmore's Road	Unprotected	
Summerhill Avenue	"	
Yonge Street		Gates and watchman.
Avenue Road		"
Poplar Plains Road		Electric bell.
Davenport Road		Gates and watchman.
Huron Street	Unprotected	
Spadina Road	"	
Howland Street	"	
Albany Avenue	"	
Bathurst Street		"

Name of Road.	Kind of Crossing.	How Protected.
Christie Street	Unprotected	
Shaw Street	"	
Ossington Avenue	"	
Dovercourt Road	"	
Bartlett Avenue	"	
Dufferin Street		Gates and watchman.
McKenzie Avenue	Unprotected	
Symington Avenue	"	
Edmund Street	"	

GRAND TRUNK RAILWAY.

Road Crossings in and about Toronto.

Name of Road.	Kind of Crossing.	How Protected.
From York to Humber—		
Main Street York	Overhead bridge.	
Woodbine Avenue	Grade crossing	No protection.
Greenwood Avenue	"	"
Jones Avenue	"	Gates.
Pape Avenue	"	"
Gerrard Street, East	Subway	
Logan Avenue	Grade crossing	"
Queen Street, East	"	"
Eastern Avenue	"	"
Cherry Street	"	Watchman.
Trinity Street	"	No protection.
Parliament Street	"	"
Yonge Street	"	Watchman.
Bay Street	"	Gates.
York Street	Overhead bridge.	
John Street	"	
Spadina Avenue	Grade crossing	No protection.
Bathurst Street	Overhead bridge.	
Dufferin Street	Grade crossing	"
Dunn Avenue	"	Watchman.
Jamieson Avenue	"	No protection.
Dowling Avenue	"	Watchman.
Queen Street, West	"	Gates.
Indian Road	"	No protection.
High Park, East	"	Gates during summer.
" West	"	" " " "
Ellis Avenue	"	No protection.
Windermere Avenue	"	"
Jane Street	"	"
Queen Street, West of Humber	"	Watchman.

Name of Road.	Kind of Crossing.	How Protected.
From Bathurst Street to Weston—		
Strachan Avenue	Grade crossing...	Gates.
King Street	Subway.....	
Queen Street.....	"	
Brock Avenue	Grade crossing...	"
Dundas Street.....	Overhead bridge.	
Bloor Street.....	Grade crossing...	"
Royce Avenue	"No protection.
Weston Road.....	" "
Davenport Road	"Gates.
Weston Road.....	Overhead bridge.	
4th Concession Road	Grade crossing...	No protection.
5th " "	"	"
Denison Avenue	"	"
Dufferin Street, Weston.....	"	"

From Parkdale to Fairbank—

Queen Street	Subway.....	
Brock Avenue	Grade crossing...	Gates.
Dundas Street.....	Overhead bridge.	
Bloor Street	Grade crossing...	No protection.
Royce Avenue.....	"	"
Davenport Road	"Gates.
St. Clair Avenue.....	"No protection.
Eglinton Avenue.....	Overhead bridge.	

Don Belt Line from Don to Fairbank—

Eastern Avenue	Grade crossing ..	No protection.
Queen Street	" ..	Gates.
Gerrard Street.....	Overhead bridge.	
Winchester Street.....	Grade crossing ..	No protection.
Park Drive	" ..	"
Bay View Avenue.....	" ..	"
" "	" ..	"
St. Clair Avenue.....	Overhead bridge.	
Moore Park Road	" ..	
Yonge Street	Subway.....	
Street, not now operated	Grade crossing ..	No protection.
Avenue Road " "	" ..	"
Eglinton Avenue " "	Overhead bridge.	
Bathurst Street " "	" ..	
York & Vaughan Road "	Subway.....	

Name of Road	Kind of Crossing.	How Protected.
Humber Belt Line from Carlton to Humber—		
Weston Road, not now operated	Subway	
Albany Road	"	"
Symes Road	"	"
Castle Crescent	Grade Crossing	No protection.
Jane Street	"	"
St. Clair Avenue	"	"
Dundas Street	"	"
Louisa Street	"	"
Howland Avenue	"	"
Cataract Street	Subway	"
Robert Street	"	"
Bloor Street	Grade crossing	"
Jane Street	Overhead bridge	"
College Street	Grade crossing	"
Road Allowance between Con. 1 and Bloor Street	"	"

THIRD SECTION OF REPORT.

THE MARSH AREA AND DIVERSION OF THE RIVER DON.

The attached plan (No. 1) shows the "Marsh area" and its position in relation to the southern front of the eastern part of the City of Toronto, between Parliament Street and Kippendavie Avenue, a distance of 3 1-5 miles.

The width of this area is some 6,000 feet on the western, or Toronto Harbour front, while its eastern extremity is contracted to some 850 feet. The southern, or lakeward limit, lies beyond the sand-bar or "island," and generally follows the course of the beach line as it existed 23 years ago, when the property was deeded to the City. The landward limit is marked by the Don river and practically the north side of the road allowance bordering the channel from Toronto Harbour, to and along Ashbridge's Bay, which is situated at the east end of the area.

Within the limits are some 1,335 acres, of which about 230 acres (Block 1) lie on the eastern margin of Toronto Harbour, with a frontage line extending from Parliament Street to the Harbour entrance, a distance of 6,000 feet, and from this line eastward for an average distance of 1,800 feet to the sheet piled dyke erected on the almost parallel line which divides the marsh proper from Toronto Harbour.

Adjoining the dyke a roadway (extending one mile from the Don river at Cherry Street bridge to the sand-bar or "island") has been constructed by the City Engineer's Department with ashes and sweepings, etc., thus opening up the locality and affording access to the eastern entrance piers and to the lake beach.

To the east of the roadway and dyke above mentioned the shallow marsh proper commences (Block 2), and extends for about three-quarters of a mile, with a content of some 500 acres, including the outer sand-bar.

Near the northern margin of the property a channel was dredged by the City, from Toronto Harbour to the lake opening at the eastern extremity of Ashbridge's Bay, for the purpose of purifying the waters of these bays by current effect, due to the action of the winds on the waters of Lake Ontario.

The result has been beneficial and a channel should be maintained until the City sewage is properly disposed of, after which the diverted waters of the River Don will doubtless keep Ashbridge's Bay in a good sanitary condition.

As the River Don (which now discharges its contents into Toronto Harbour) is primarily responsible for the formation of the "marsh area" and the island by reason of the detritus brought down during spring floods, it is, therefore, in order that the course of the river and its presently injurious effect should be referred to, before suggesting the means of curing the evil and improving the locality and, as its divergence has been recommended in every engineering report on Toronto Harbour, the attention of the Council is called to that of Messrs. Jennings and Roy, wherein is embodied a full statement regarding the River Don, and from which extracts (in appendix "A" hereto) have been made as pertinent to the right understanding of the position.

Having recited matters on this subject and in view of the possible early occupation of a large portion of the Harbour frontage and "marsh" to the east of it, I therefore beg to recommend that the deviation of the Don and reclamation work be treated in accordance with the following suggestions:

That a By-law be passed enforcing Ontario Statute 49, Chap. 66, and providing funds for the purchase of the necessary lands and for construction charges.

The deviation of the River Don southward from the Grand Trunk bridge, as proposed in Harbour Report above quoted.

The filling up of the present channel (of the same river) from the proposed point of deviation westward to Parliament Street.

The gradual formation of a new channel from Toronto Harbour to Ashbridge's Bay, about on the line of the northern margin of "Simcoe Park."

NOTE.—It is not likely that this channel will be required on sanitary grounds after the sewerage problem has been satisfactorily dealt with.

The closing of the present sanitary channel between a point 60 feet west of Cherry Street produced and the west side of the Don deviation aforesaid as it seriously hampers the economical arrangement of tracks, sidings, streets and blocks of land on the new area.

The employment of a suitable dredging machine for the continuous improvement of the area during the summer months.

The continuation of land making with refuse, ashes, etc., collected by the City Engineer's Department.

The extension of a temporary track from the railways near Cherry Street to and along the roadway already built behind the dyke, thereby affording immediate access to adjoining sites which may be taken up for factory purposes.

The gradual enclosure by sheet-piling of the area immediately to the south of Gooderham's elevator for the receipt of excavated and refuse earthy material.

On the acceptance of this scheme the present registered plan of the district should be cancelled and a new one prepared shewing projection for railway tracks, accommodation sidings, roadways and blocks of land available for factory sites, so that those interested may be furnished with such usual information as will enable them without delay to arrive at a decision.

The attached plans (3) explain the features touched upon.

Should detailed plans and estimates be required in connection with this report, they can be furnished in a few days from time of request.

I remain, sir,

Yours respectfully,

W. T. JENNINGS,

M.I.C.E.

APPENDIX "A."

Extracts from the Report of Messrs. Jennings & Roy, dated 1900, on Toronto Harbour and the River Don.

The River Don takes its rise in the county of York, twenty miles to the north of Toronto in the hills (Oak ridges) forming the divide between Lake Ontario and Lake Simcoe watersheds (fully 800 feet above the former). It drains an area of 125 sq. miles, principally in the townships of York, Whitchurch and Scarboro. Its various branches trend in a south-easterly direction till they become united in the township of York, a few miles to the north of the easterly side of the City of Toronto, whence in one channel

the stream passes through the Don Valley in the City of Toronto, and discharges in Toronto Harbour at its eastern extremity.

The area drained by the various branches of this river is nearly all in a thorough state of cultivation.

The soil varies, but is generally sandy loam and loamy clay.

The slope of the watershed embraced within the area drained, being somewhat steep, the discharge of the river is perhaps more rapid than usual in this part of Ontario.

The following table of precipitation within the district, also gauging of flow of the River Don taken after the last ice and flood water had passed, shew that in ordinary the volume of water is small, while a rapid thaw or sudden downpour of rain, such as that noted in August, 1878, has the immediate effect of creating a torrent, and it is at these times when the great bulk of the silty matter is brought down.

ANNUAL PRECIPITATION AT THE UNDERNOTED PLACES.

Toronto—

Average precipitation (59 years)	33.944 in.
Rain (maximum annual fall (1843)).....	43.555 in.
Rain (minimum annual fall (1874))	17.574 in.
Melted snow (maximum annual fall (1870))	12.29 in.
Melted snow (minimum annual fall (1899))	3.18 in.

Thornhill—

Precipitation, parts of 1870-1-2	28.09 in.
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Markham—

Precipitation, 1870-1-2	31.68 in.
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Stouffville—

Precipitation, 1895-6-7-8-9	34.94 in.
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Agincourt—

Precipitation, 1896-7-8-9	30.58 in.
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Scarboro Junction—

Precipitation, 1884 to 1899 (14)	29.78 in.
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Toronto—

Heaviest fall of rain in 24 hours:

3.455 in.....	14th September, 1843
3.450 in.....	4th August, 1878
3.881 in.....	27th July, 1897

Heaviest fall of rain in short periods:

2.420 in.....	June, 1892, in 63 minutes.
2.450 in.....	August, 1878, in 4 hours.
1.800 in.....	June, 1890, in 28 minutes.
1.440 in.....	June, 1892, in 25 minutes.

April 24th. The various branches of the River Don were measured and the following approximate discharges obtained:

Rosedale Sewer	100 cub. ft. per min.
Rosedale Creek	25 cub. ft. per min.
Taylor's Creek	50 cub. ft. per min.
Cudmore	10 cub. ft. per min.
West Branch	10 cub. ft. per min.
East Branch	175 cub. ft. per min.
Main Stream	335 cub. ft. per min.
Total	1045 cub. ft. per min.

May 7th. Mean of three observations taken gave flow of Don River channel at 5,500 cu. ft. per minute, while on the 26th, at a point where it runs on a smooth rock bed, a tile pipe 12" diameter, and with its depth, as head, would have been ample for the passage of the entire stream.

The superior state of cultivation and farm drainage throughout the district results in a rapid venting of water during storms or thaws, and torrents thus formed cut away friable earthy material from the adjoining banks and carry it to a place of deposit in Toronto Harbour.

In ancient days this discharge occurred in the present marsh area while at a later date, early in this century, it was turned into Toronto Harbour at a point on its eastern side and midway between the City and the peninsula to the south.

A change seems to have again taken place on or about the time of construction of the Grand Trunk Railway (1854), after which the course of the river deviated to a point of discharge at the north-easterly angle of Toronto Harbour and near the foot of Parliament Street.

It is quite evident from comparison of the soundings taken in early days (1812) with those of present date, that a very large amount of sand and silty material has been deposited over the entire harbour, but more especially at its eastern end, and largely due to the discharge of earthy material by this river.

Under Statutes and By-laws of the City of Toronto and authority of Ont. 49, cap. 66, the work of straightening and deepening the channel of the River Don between Winchester Street and the Grand Trunk Railway bridge

near the marsh front, a distance of 6,800 feet, was undertaken in 1887 and completed, as far as then required, in 1889, with the result that a large area of low, wet land was reclaimed, and a much improved sanitary condition of the neighbourhood brought about.

In 1882 a considerable sum of money was spent by the Harbour Commissioners in "protecting" the Don channel by the introduction of a line of sheet piling from Cherry Street westward opposite Gooderham's wharf, thence by crihwork on the same line to the west side of Berkeley Street produced.

This line of crihwork was intended to protect the Don channel from the inflow of sand working northward from the eastern gap, just formed, while it had the adverse effect of discharging the silt from the River Don westerly and close along the wharf heads.

From cross-section measurements taken on the improved Don channel between Winchester Street and the Grand Trunk Railway bridge (a distance of 6,800 feet) in 1889, and repeated in November, 1891, a deposit of 137,000 c.y. had been made. Again, from measurements made in April last (after the spring floods) a total deposit of 172,000 cubic yards was found, shewing that the channel became gorged within two years after its formation. Hence, it is evident that a large quantity of solid matter is annually deposited in Toronto Harbour.

The diversion of the Don to the marsh area will be the means of making up land, inasmuch as the quantity of sand and silt discharged per annum, by this stream, cannot be less than 75,000 cubic yards, which, if consolidated to a depth of 10 feet, will equal above five acres of made land per annum.

Some years ago the Harbour Commissioners acquired land to the south of the Grand Trunk Railway and near that company's bridge over the Don River, for the site of a relief channel leading to the marsh in the supposed course of the contemplated Don Improvement works, and a small cut was dredged for a few hundred feet southerly, but being out of line of the improved channel to the north, and not of as great dimensions as that of the old channel it consequently only afforded partial relief.

To prevent further deterioration to Toronto Harbour, and to obtain the benefit of the material brought from this source it is now advised:

That a new channel for the Don be constructed (at a width of 125 feet and a depth of 14 feet below low water) southerly and in prolongation of the present channel between King Street and the Grand Trunk Railway bridge, thence to and across the Ashbridge's Bay channel from Toronto Harbour, and almost to the Island bar, a total distance of 4,800 feet, with minor leading channels diverging therefrom in the marsh area, and, if found advisable, to an enclosed area at the east side of Toronto Harbour.

That the present course of the Don be effectively separated from the new one, at the westerly line of the new channel south of the Grand Trunk Railway bridge, and that the present course be done away with and filled in by the City and other interests.

That the portion of the new channel from the Grand Trunk bridge to the Ashbridge's channel be finally protected by sheet piling in a manner similar in design to that on each side of the "Don Improvement," and that the sheet piling be "returned" for a short distance on each side of Ashbridge's channel.

That adequate means be provided to prevent flood water from taking the Ashbridge's channel.

To retain as much of the earthy matter as possible within the marsh area, and, in the meantime (to prevent its discharge throughout Ashbridge's Bay proper, except in a somewhat clarified condition) a dredged dyke be thrown up from the south bank of Ashbridge's channel (and about opposite Blong Street) southerly, and at right angles thereto as far as the island bar, say, 3,300 feet. The material excavated for this dyke should be deposited on the east side of the place of excavation, and it should be protected by splash boards.

Thus will a settlement basin be formed for a great percentage of the solid matter brought down during the periods of flood water.

The reclamation of this area can be further accelerated by the judicious use of an hydraulic dredge or sand pump in clearing deposits of silt from the channels or "leads" for the rush of flood water, and, as these channels silt up a continuation of dredging and land making will thus ensue.

The items of work and expenditure to carry out the deviation of the Don River into the marsh will be approximately as follows:

Land for diversion of channel-exchange—no price.	
Dredging new channel to 14 feet net, and for dyke, 300,000 c.y. at 12c.	\$36,000
Sheet piling side of new channel, 3,500 feet at \$9..... (The sheet piling need not now be introduced)	31,500
Splash boards, etc.	500
Barriers, etc., on Ashbridge's channel, etc.	6,000
Contingencies	6,000
	<u>\$80,000</u>

"When the marsh area is made up and no other requirement found for the earthy affluent, the stream can then be led to final discharge in the

lake, either by the present opening from Ashbridge's Bay or by a new one situated west of it."

Memo.—From the foregoing it is evident that the writer gave the subject his careful consideration, and he has, therefore, little new to add. However, it may be stated that the purpose of the report quoted was for view from a general standpoint, and did not require an opinion on the work done such as the position of the "sanitary" channel between Toronto and Ashbridge's Bay.

It may also perhaps be helpful to remind the Council that when the treatment of the marsh area was considered by the writer in his report of May, 1890, the proposed channel then suggested was for commercial purposes, and on the understanding that it was the desire of the Harbour Board, the Grand Trunk Railway Company, the Dry Dock Company and the Gooderhams that the present Don channel be kept open along their frontages.

Again when the agitation was commenced with a view to improve sanitary conditions in Ashbridge's Bay, the writer, as City Engineer, obtained authority to make a dredged cut from Toronto Harbour eastward through the ill-advised dyke and the marsh, on line of former open water (about three-quarters of the distance from Gooderham's wharf and the eastern entrance pier), and that a commencement was made on this work, when the Harbour Board entered objection for some reason and operations were suspended.

W. T. J.

