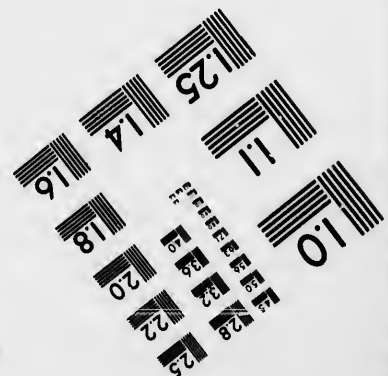
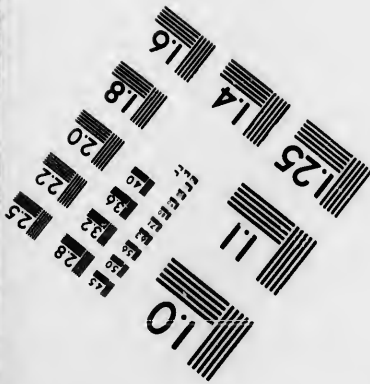
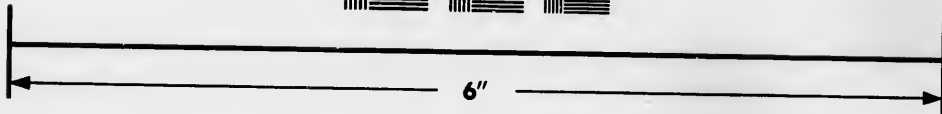
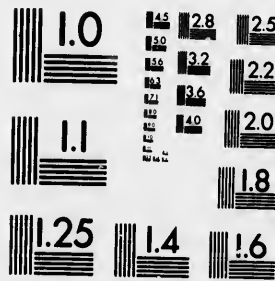


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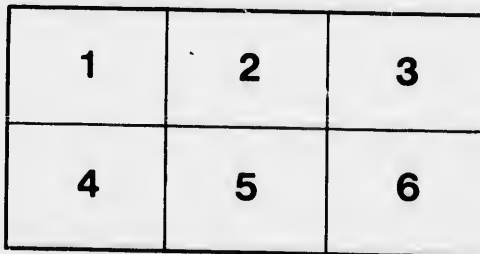
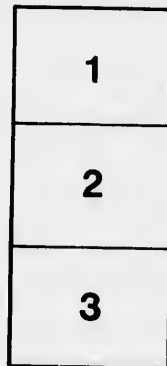
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NORTH SHORE RAILWAY.

ENGINEER'S REPORT

ON THE LOCATION BETWEEN WEST END OF FORMER LOCATION (OCT.,
10, 1872) AND THE CITY OF MONTREAL.

OFFICE OF THE ENGINEER IN CHIEF,
QUEBEC, Oct. 9, 1873.

MR. PRESIDENT :

I have the honor to submit herewith, for the examination and approval of the Board of Directors, the location maps and profiles of that portion of the line of the North Shore Railway, extending from the East end of Section No. 132 (being the West end of location as adopted by the Board on the 10th October, 1872), to a point within about four miles of the Easterly limits of the City of Montreal.

It will be remembered that the maps and profiles submitted to the Board of Directors, on the 10th October, 1872, extended over the entire line from Quebec to Montreal; and that, for reasons stated in my report of that date, it was recommended that only the portion of the line extending from the initial point, in the City of Quebec, to the East end of Section No. 132, should be acted upon by the Board at that time.

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ENGINEER'S REPORT.

The reasons then referred to, had reference more particularly to the crossings of L'Assomption River, and the Lower or Easterly branch of the Ottawa River, both of which occur upon that portion of the line, West of Section No. 131.

Several lines had been examined during the years 1871 and 1872, which crossed these streams at different points; and the one delineated upon the map which was submitted to the Board on the 10th October, 1872, and which crossed both of these rivers at Bout de l'Isle, was at that time considered the best that could be obtained; and therefore as coming within the provisions of the contract, which specifies "that the most direct and practicable route of which the capabilities of the country will reasonably admit, shall be adopted both for the Main line and Branch."

Another line was also traced approximately, upon the same map, which crossed L'Assomption River, about one mile above L'Assomption Village; and crossed the Ottawa Branch, a little above the Village of Lachenaye.

The maps and profiles now laid before the Board, embrace the two lines above referred to, and also another, or intermediate line, which has been run during the present season, and which crosses L'Assomption River above the Village of that name, and the Ottawa Branch about midway, between the Isle de Bourdon and the Isle de Jesus.

These three lines are respectively designated upon the maps and profiles as follows:

- Line A. Bout de l'Isle, or Lower Crossing.
- Line B. Intermediate, or Middle Crossing.
- Line C. Lachenaye, or Upper Crossing.

The general characteristics of these lines are as follows :

Designation of Line.	Length in miles.	Maximum grade per mile.	Minimum Radius in feet.	Rise & fall in feet.	Degrees of curvature.	Length of Tangents in feet	Length of curves in feet.
A	27 $\frac{740}{5280}$	52.80	955.37	199.50	174° 13'	133,625	9,675
B	27 $\frac{3375}{5280}$	42.24	1910.08	186.50	120° 07'	139,103	6,832
C	29 $\frac{1220}{5280}$	52.80	1273.57	401.50	436° 32'	133,304	21,115

A comparison of these lines will show that the line B, or Middle Crossing, is superior to the line A, or Lower Crossing, in all respects save one, which is its greater length of 2,635 feet, or about one half mile. And also that Line B is superior to the Line C, or upper Crossing, in every respect.

The great, and to my mind, the insurmountable objection to the Line A, is the crossing of the Ottawa Branch, at Bout de l'Isle.

When this line was run in 1872, I had not become so fully impressed as I since have been with the difficulties and dangers attending the movement of large rafts of timber, lumber and logs, which, during the season of navigation, are almost constantly being towed down this branch of the Ottawa River into the St. Lawrence, through the crooked, narrow and rapid channels that flow between the Islands opposite Bout de l'Isle.

A careful observation of these difficulties during the present season, has fully satisfied me, that neither the Government, nor the great lumber interests of the country would ever consent to the location and construction of a

railway bridge, either at, or in the immediate vicinity of the lower crossing on Line A.

I am further satisfied also, that, if all parties should consent to the construction of a bridge at this point, the Railway Company would always be liable, either to have the bridge carried away by these immense rafts, or to pay heavy damages for breaking them up, and perhaps destroying them.

Another very serious objection to Line A, is the fact that a draw-bridge will be required over L'Assomption River, near its mouth, for the accommodation of steamboats and vessels that navigate the lower portion of that river.

The middle crossing, upon Line B, has been selected with great care, and almost entirely with a view to the avoidance of the difficulties above referred to.

At the point indicated upon the map as the crossing of this line, it will be observed that the entire River occupies one straight channel for a considerable distance above and below the point of crossing; and, therefore, that there is ample room for steamers and vessels going in either direction, and for rafts passing down the river, to make and pass the draw opening in the bridge, in comparatively smooth water, and with perfect safety.

It will also be observed that Line B, crosses L'Assomption River considerably above the highest point at which it is navigable, and therefore no draw opening will be required in the bridge.

It should also be noticed that this line passes much farther inland than Line A, and will therefore accommodate a much larger extent of country.

Referring again to the foregoing tabulated statement of the principal engineering characteristics of the three lines

shown upon the map, it will be seen, as before observed, that Line B is superior to Line C, in every essential particular.

It is about one and two thirds miles shorter.

The maximum grade is more than ten feet less per mile.

The minimum radius of curvature is 636 feet greater.

The total rise and fall in gradients is 215 feet less.

The total curvature is 316 degrees less.

The length of tangents, or straight lines, is 5,790 feet greater ;

And the length of curved line is 14,283 feet less.

A draw-bridge will also be required upon Line C over each branch of the Ottawa River, upon either side of the Isle de Jesus ; whereas but one draw opening will be required upon Line B.

The foregoing facts therefore demonstrate most conclusively, that Line C is *not* " The most direct and practicable route of which the capabilities of the Country will reasonably admit. "

The principal reason for running the Line C, and instituting a comparason between it and the other lines now under consideration, was the fact, that an idea has been entertained in some quarters, that such a line would materially shorten the future connecting branch, or cut off, between the North Shore, and the Northern Colonization Railways, upon the North Easterly side of this branch of the Ottawa River.

The idea has also been suggested that the two roads might be brought together at a common point upon this side of the Ottawa River ; and that one bridge over the Ottawa, and one line from the Junction to Montreal, could be made to answer the requirements of both roads.

With reference to these very important and desirable considerations, I would respectfully remark, that if both lines of Railway were under one management; or if the interests of the two Companies were identical in all respects: and if neither the Provincial Government, nor the City authorities of Montreal had any control over the question, it is not at all impossible that such an arrangement as the one last referred to might be effected; but under all the circumstances as they now exist, I can see no good reason for believing that such an arrangement would be at all practicable, either at the present time, or in the very near future.

And even if such an idea was now to be entertained by either or both Railway Companies, I think it could be demonstrated beyond a doubt, both in an engineering, and in a commercial point of view, that the proper point of junction would be with the Line B, upon the North Easterly shore of the Ottawa River.

With reference to the comparative length of a connecting branch between the two roads, it will be sufficient to state, that the distance between the two crossings B and C, as shown by the broken line upon the map, is only about two and one half miles. Also, that the distance from a common point, at the west end of location, as adopted Oct. 10, 1872, to the point of proposed departure of the branch line via C direct, is only about one mile shorter than via the Line B, including the connecting branch line as shown upon the map; and further, that the distance from the same common point, at west end of former location, to Montreal, is one and two third miles greater via Line C than via Line B.

From the above statement of facts, it appears quite

evident that, while the adoption of Line C would produce a saving in distance of about one mile, in the transportation of such passengers and freight as were destined to pass directly between Quebec and the City of Ottawa, or intermediate points, without stopping at Montreal, it would, at the same time add about one and two third miles in distance to the transportation of all passengers and freight that were destined to pass directly between Quebec and Montreal, or intermediate points, besides subjecting this transportation, during all time, to the disadvantages as heretofore shown, growing out of the comparatively unfavorable engineering features of Line C, the most of which occur between the crossing of the Ottawa River, and the City of Montreal.

It becomes my duty, in this connection to call the attention of the Board of Directors to some resolutions that were adopted at a special meeting of the City Council of Terrebonne, held on the 5th December, 1872.

In these resolutions the Railway Company is solicited "to run their Road within or near the limits of the Town of Terrebonne," in which case "the Corporation of the Town of Terrebonne would be happy to offer an aid to the Company," &c., &c.

These Resolutions were duly transmitted to the Board, and on the 20th December they were referred, by order of the Board, to the Engineer in Chief for a Report.

The Report however, has been withheld until the present time, for the reason that the subject could not be treated intelligently until all the surveys had been completed, upon this portion of the line.

Immediately upon the receipt of the resolutions, I directed Mr. Henshaw, then resident engineer of the

Montreal Division, to make a personal examination of the country between Lachenaye and Terrebonne, and to report upon the feasibility of carrying the line through Terrebonne, as requested by the City Council.

Mr. Henshaw reported to me on the 2nd January 1873, that the route was quite feasible, but that it would increase the distance between Quebec and Montreal about three miles over the Lachenaye line, and about five miles over the Bout de l'Isle line. He also reported that the line via Terrebonne would necessarily encounter the same, or even greater objectionable features in respect to gradients, curvature, &c., as were found upon the Lachenaye line.

While duly appreciating the great benefits which a flourishing town like Terrebonne would receive from the location and construction of the railway in its immediate vicinity; and also the additional traffic that such a location would in all probability bring upon the road, yet the foregoing important considerations have forced me to the conclusion that it would be highly inexpedient for the company to comply with the request contained in the resolutions.

It should also be borne in mind, while considering this question, that, whenever the connecting branch shall be constructed between the North Shore, and the Northern Colonization Railways, the town of Terrebonne, as well as all the intervening towns and parishes lying upon the easterly shore of the Ottawa Branch, between the two roads, will be placed in direct communication with either line, and thus secure perhaps greater benefits, than would be derived from the location of this road as applied for in the resolutions.

Having thus presented to the board of Directors the principal features of the different routes between the west end of the former location, and the City of Montreal, I would most respectfully but unhesitatingly recommend the adoption of the line marked B, or the middle crossing of the Ottawa Branch, in preference to either of the other lines herein referred to.

In arriving at this conclusion, it may be proper to state that the stipulation contained in the present contract for the construction and equipment of the road, which provides "that the most direct and practicable route of which the capabilities of the country will reasonably admit shall be adopted," has exercised a controlling influence over my mind; and I think it has been satisfactorily demonstrated that, owing to the impracticability of maintaining a bridge over the Ottawa Branch at the lower crossing upon line A, the line marked B, or middle crossing, is the only one which comes literally within the requirements of the contract.

In addition to this, I have become thoroughly impressed with the fact, that it is quite as important to form the most direct connection practicable with the City of Montreal, and the great amount of business which must always converge at that point from the south and west, as it is to form the shortest connection with the proposed Northern Colonization Railway, and the proposed lines extending westward from the City of Ottawa, by which it is proposed, at some indefinite period in the future, to connect with Toronto, Georgian Bay, Sault Sainte-Marie, and the Canadian Pacific Railway.

There can be no doubt that, under any circumstances, we shall monopolize the through traffic which comes and

goes by the valley of the Ottawa River ; and there can be no reasonable doubt that, by adopting the most direct and practicable route to Montreal, we shall secure much the largest share of the through business which naturally concentrates at that point for transmission to Quebec and intermediate points.

Although the maps and profiles now placed before the Board, show the different lines extended to a point within the easterly limits of the City of Montreal, I would respectfully recommend that no decision be made at the present time respecting the location west of the east end of Section No. 155, or a point situated about four miles easterly of the City limits, and designated upon the maps and profiles as the " West End of Location as recommended Oct. 9th, 1873."

This point is so situated that a tangent line, or its equivalent, may be extended from it, to any point in the eastern boundary of the City of Montreal, which may be selected hereafter as the most eligible point for entering the City.

Several lines have already been run from this point to the City, one of which is a continuation of line B, and terminates at a point 175 feet within the City limits, and about 900 feet from the top bank of the St. Lawrence River; and another line, marked D, upon the map, is made to approach considerably nearer to the top bank of the St. Lawrence River, and enters the City in the vicinity of the turnpike road, as it connects with St. Mary's street, within the City.

There are several reasons why the location of the last four miles of the line nearest to the City of Montreal, can-

not be decided upon intelligently at the present time; and the progress of the work will not necessarily be delayed if the decision be deferred until the Spring of 1873.

At the same time, I regard it as quite important that the location of the road should be definitely fixed by the Board of Directors as far westerly as the point above indicated, at the earliest day practicable, in order that the plans for crossing the different rivers may be submitted to the Government for approval, as required by law; and also that the working plans for the foundations of the different bridges, may be perfected in time to allow the Contracting Company to procure and deliver upon the ground the materials necessary for the work, during the present season.

Assuming that the change in the original location in the vicinity of St. Bartholemi Church, east of Berthier, as recommended in my report of the 11th September last; and also that the line now recommended, shall meet with the approval of the Board of Directors, I have prepared the following revised table of distances upon the Main Line, from the initial point in Quebec, to the end of the present surveys in Montreal, including several of the most prominent points upon the Line, which will be found convenient for future reference :

TABLE of distances upon the located line of the North Shore Railway.

PROMINENT POINTS UPON THE LINE.	INTERMEDIATE		TOTAL.	
	DISTANCES.		DISTANCES.	
	Miles.	Feet.	Miles.	Feet.
West End of St. Paul's Market, City of Quebec.....	0		0	
Gosford Railway Crossing.....	4	3730	4	3730
Swede Road.....	2	2290	7	740
Cap Rouge River.....	6	620	13	1260
Paradis Summit.....	5	1000	18	2360
River Noire.....	2	2590	20	4950
River Aux Pommés.....	2	1748	23	1418
Jacques Cartier River.....	1	1420	24	2838
River Port Neuf.....	8	4860	33	2418
Opposite Port Neuf Church.....	0	4700	34	1838
Opposite Deschambault Church.....	3	5160	38	1718
River Belle-Isle.....	2	1340	40	3058
River Lachevrotière.....	1	820	41	3878
St. Casimir Road.....	3	716	44	4594
St. Anne River.....	7	2720	52	2034
Batiscan River.....	4	980	53	3014
Champlain River.....	6	320	62	3334
Piles Branch.....	11	2216	74	270
St. Maurice River.....	1	3520	75	3790
City of Three Rivers.....	1	2920	77	1430
Point Du Lac.....	6	3320	83	4750
River St. Charles.....	1	2420	85	1890
River Aux Glaises.....	2	3440	88	50
River Yamachiche.....	2	2840	90	2890
Little Yamachiche River.....	0	4100	91	1710
River Du Loup.....	6	320	97	2030
Little River Du Loup.....	0	4300	98	1050
River Maskinongé.....	3	4160	101	5210
Opposite St. Barthelemi Church.....	5	1400	107	1330
River Chicot.....	4	5180	112	1230
River Bayonne.....	2	342	114	1572
Village of Berthier.....	0	3900	115	192
River Chaloupe.....	1	1087	111	1279
Joliette and Lanoraie Railway.....	7	290	123	1569
West End of Location, (Oct., 10th 1872).....	7	2290	130	3859
River L'Assomption.....	6	755	136	4614
River Ottawa (East Bank).....	9	680	146	14
River Ottawa (West Bank).....	0	2100	146	2114
Point-Aux-Trombles.....	3	5180	150	1994
Longue Point.....	3	3960	154	674
West End of Location (Oct., 9th 1873).....	0	0000	154	674
Opposite Hochelaga Convent.....	3	1260	157	1934
West End of Surveys, Montreal.....	1	0020	158	1954

The following analysis of the principal Engineering characteristics of the Main Line, has also been prepared, for the purpose of showing the peculiarly favorable features of the North Shore Railway, for the transaction of a heavy freight and passenger traffic.

PRINCIPAL CHARACTERISTICS.	LENGTH.		PERCENTAGE OF ENTIRE LINE.
	Miles.	Feet.	
Entire Main Line	158	1954
Straight line, or tangents.....	144	1613	.90
Curved lines.....	14	341	.10
Gradients either level, or inclining 10 feet, and less per mile.....	102	2722	.65
Gradients inclining more than 10, and 30 feet or less per mile.....	29	5017	.19
Gradients inclining more than 30 feet, and less than 52.8 feet per mile.....	15	3575	.10
Gradients inclining the maximum of 52.8 feet per mile...	10	1200	.06

Before closing this report, I desire to bear testimony to the unusual ability and energy with which the surveys in the field have been prosecuted during the present season.

The engineering party took the field on the 15th July last, and was placed in charge of Mr. Libert Chandler, Assistant Engineer.

On the 1st September, Mr. Chandler was assigned to another field of duty, and his place was filled by Mr. I. P.

Pranishnikoff, his former transitman, who conducted the surveys until the party was disbanded on the 6th September.

It will be a sufficient encomium upon these gentlemen to state, that notwithstanding the fact that twelve and a half days were lost by rainy weather, and by removing the party from place to place, during the period above mentioned, lines amounting in the aggregate to a distance of 78 miles, were instrumentally examined with all the precision and care that is ordinarily bestowed upon a located line.

All of which, is most

Respectfully Submitted,

SILAS SEYMOUR,

Engineer in Chief.

To Colonel

WM. RHODES,

President of the

North Shore Railway Company.

