



## REFERENCE PAPERS

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BACKGROUND OF THE GREAT LAKES - ST. LAWRENCE  
WATERWAY AND POWER PROJECT.

Extent of Great Lakes - St. Lawrence System

From the Straits of Belle Isle, the Great Lakes - St. Lawrence System extends inland for 2,225 miles: about one eighth of the distance around the world at the latitude of Cornwall, Ontario. The western end of the system in Canada, at Fort William, is at the very heart of the continent, nearly half way between Cape Breton and the Pacific.

Potentialities for Navigation

From the earliest history of colonization in North America, the St. Lawrence System has provided a valuable navigation route. Its potentialities have been developed down through the centuries until at present the route is navigable over most of its length to large-size, deep-draft vessels. From the mouth of the Gulf, there is no serious obstacle to navigation for the 1000 miles to Montreal, channels being dredged to a minimum depth of 32½ feet. Upstream for the next 115 miles, however, navigation is limited by the controlling 14-foot depth in the 35 miles of existing Canadian canals along the north shore of the River.

Through the Thousand Islands Section, the Welland Canal, the connecting channels between Lake Erie and Lake Huron, and between Lake Huron and Lake Superior, there is a channel depth of 25 feet (21 feet in the upbound channels in the Upper Lakes) capable of being increased to 27 feet by dredging only. Existing locks have a depth of 30 feet over the sills and would require no alteration. A continuous 27-foot navigation route throughout the entire Great Lakes - St. Lawrence System would require the completion of 40 miles of canals, with 7 locks and 8 movable bridges, in the all-Canadian and International Rapids Sections, and channel dredging only in various sections from the Thousand Islands to the Head of the Lakes.

The physical features of the St. Lawrence System and the existing and proposed navigation works are shown in tabular form on the attached chart.

Potentialities for Power

The attached chart also gives an indication of the hydro-electric power potentialities of the system. From Lake Superior to the Atlantic Ocean, there is a total drop of more than 600 feet. Lake Superior pours an average volume of 71,000 cubic feet per second into Lake Huron, and the volume of outflow increases through the length of the system until, at Lachine, there is an average flow of 262,000 cubic feet per second. If all power developments which now appear economically feasible were completed, the system could produce approximately 8,000,000 horsepower of hydro-electric energy for use in Canada and the United States. Only a little more than one-third of the hydro-electric power potential of the system has been developed. Joint development by Canada and the United States, in the International Rapids Section, could add 1,100,000 horsepower to the power production of each

country. In addition, about 2 $\frac{1}{4}$  million horsepower remain to be developed for Canadian use, when required, in the all-Canadian Soudan and Lachine Sections.

History of Negotiations

The recent history of Canada - United States negotiations begins about the end of the last century. It should be mentioned, however, that the piecemeal development of the St. Lawrence System began centuries ago, and that important navigation improvements were being carried out on the Canadian side during most of the last century. In 1895, agitation for the improvement of inland waterways resulted in the appointment by Canada and the United States of Commissions of Inquiry, even before the completion by Canada of the 14-foot navigation system from Montreal to the Upper Lakes in 1900. In 1912, the Canadian Government decided to undertake the construction of a new Welland Canal (completed in 1932) which would eventually form an essential link in a projected deep water navigation route. Proposals for further joint Canada-United States consideration were cut short by the first World War, but were renewed after it and resulted in a decade of extensive studies and investigations during the 1920's. These, in turn, led to the signing by Canada and the United States of the St. Lawrence Deep Waterway Treaty in 1932. In 1934, this Treaty failed to receive the necessary two-thirds affirmative vote in the United States Senate required for ratification. The subject was not completely dropped, however, and studies instituted a few years later finally led to the signing of the Great Lakes - St. Lawrence Basin Agreement on March 19, 1941. Since that time, various unsuccessful attempts have been made in the United States to secure Congressional approval for the Agreement.

Provisions of 1941 Agreement

The 1941 Agreement provides: (a) for the construction of the remaining links of a 27-foot waterway from the head of the Great Lakes to Montreal; (b) for a combined power-navigation scheme in the International Rapids Section of the St. Lawrence River, the power to be developed in a controlled, single-stage project with an installed capacity of 2,200,000 horsepower; (c) for the preservation of the scenic value of Niagara Falls, combined with the increased development of power at Niagara; (d) for stabilizing the situation regarding diversions of water from the Great Lakes - St. Lawrence System; and (e) for the use, for power purposes, of waters which may be diverted into the Great Lakes System from other watersheds, such use being granted to the country making the diversions.

Although the 1941 Agreement has never received the approval of the United States Congress and the Canadian Parliament, it can still be approved by these legislative bodies and brought into force by the exchange of ratifications.

It is unlikely that the Agreement will be approved in the exact terms in which it was originally signed. Measures introduced in the United States Congress in recent years, designed to give approval to the Agreement, have contained certain important reservations and new suggestions.

Conditions of Approval by United States

A measure introduced in the United States House of Representatives, at the beginning of January, 1949, would give approval to the 1941 Agreement on condition that:

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1. The Canadian Parliament would also approve the Agreement.
2. The Canadian Government would agree to the elimination of Article VII of the Agreement. (It is contended that this Article, extending perpetual navigation rights in boundary waters, should be dealt with by separate treaty.)
3. The Canadian Government would agree to the elimination of Article VIII, section (c). (This section deals with the question of unilateral diversions of water from the Great Lakes System by either country, and would provide for a procedure of arbitration in case of damage resulting from such diversion.)
4. The Canadian Government would agree to the elimination of Article IX. (This Article would amend the provisions of the Boundary Waters Treaty of 1909 with respect to the diversion of water at Niagara for power purposes. It is contended that this should be dealt with by separate treaty.)
5. The Canadian Government would agree to the principle of self-liquidation of the deep water navigation work on the St. Lawrence River authorized by the Agreement and the approving measure. (On April 24, 1947, the Secretary of State for External Affairs stated in the House of Commons that the Canadian Government had agreed in principle to the proposal to make the waterway self-liquidating by toll charges, "subject to the conclusion of arrangements satisfactory to both Governments for the implementation of this principle.")

#### The effect of such conditions on the Agreement

The inclusion of these or other alterations or reservations in an approving measure adopted by the United States Congress would not, in itself, affect the status of the Agreement. For the Agreement to be effective and binding between the two countries, under International Law, it would of course be necessary for the Canadian Government to approve and ratify any changes put forward by the United States Government.

Furthermore, it need not necessarily follow from the inclusion of such reservations that the features of the over-all St. Lawrence problem, which are to be deleted, have thereby ceased to be regarded as important. On the contrary, the United States Government has made it clear that, in its view, each of these features should be subject to special agreement.

#### Work Required under Agreement

At this point it may be of interest to consider, in some detail, the actual work which would be undertaken if the 1941 Agreement received the approval of the legislative bodies of Canada and the United States.

In the Upper Lakes, channel dredging would be required to provide a minimum depth of 27 feet over the entire navigation route. This work would be the responsibility of the United States.

Between Lake Erie and Lake Ontario, Canada would be responsible for dredging work in the Welland Canal to increase the minimum depth from 25 feet to 27 feet.

The principal engineering works of the controlled single-stage project planned for the International Rapids Section, above Cornwall, Ontario, are the following:

1. A control dam in the vicinity of Iroquois Point.
2. A dam in the Long Sault Rapids at the head of Barnhart Island; and two power houses, one on either side of the international boundary, at the foot of Barnhart Island.
3. A side canal, with one lock on the United States mainland to carry navigation around the control dam; and a side canal, with one guard gate and two locks, on the United States mainland south of Barnhart Island, to carry navigation from above the main Long Sault Dam to the river south of Cornwall Island.
4. Dykes, where necessary, on the United States and Canadian sides of the boundary to retain the pool level above the Long Sault Dam.
5. A channel enlargement from the head of Galop Island to below Lotus Island.
6. A channel enlargement between Lotus Island and the control dam, and from above Point Three Points to below Ogden Island.
7. The necessary railroad and highway modifications on either side of the international boundary.
8. The necessary works to permit the continuance of the 14-foot navigation on the Canadian side around the control dam and from the pool above the Long Sault Dam to connect with the existing Cornwall Canal.

In the Lake St. Francis Section, a distance of 26 miles from the foot of Cornwall Island to the foot of Lake St. Francis, the provision of a 27-foot channel would mean the removal of eight projecting points and the excavation of a channel 2,000 feet in length opposite the village of Lancaster.

In the Soulanges Section, an 18-mile stretch between Lake St. Francis and Lake St. Louis, it would be necessary to dredge an entrance channel from deep water in Lake St. Francis to the entrance of the Beauharnois Power Canal, and to excavate one short side canal, with locks, to pass shipping from the Power Canal to Lake St. Louis. Two fixed bridges over the Power Canal would be replaced by movable bridges, a total of four movable bridges being required in this Section.

The Lachine Section, extending from deep water at the head of Lake St. Louis to Montreal Harbour, is the subject of a report by a Board of Engineers appointed in 1947. The Board's report was released by the Minister of Transport late in 1948, and includes several alternative schemes of development which would provide the necessary navigation improvements, with or without concurrent power development.

### Cost of Project

When the 1941 Agreement was concluded, the total cost of the project was estimated at \$544,059,000, including the cost of those works already completed. Canada's share of this cost was estimated at \$264,003,000, which included the \$131,900,000 already spent on the Welland Canal. Costs have, of course, increased considerably since 1941. The work of revising estimates and keeping them up-to-date has been continuing in both Canada and the United States. The estimates on the Lachine Section, released at the end of 1948, are an example of this type of work. At the time of writing, however, estimates for all phases of the St. Lawrence project are not available.

### Provincial Participation

Another cost factor, from the Canadian point of view, is the extent of provincial participation in the project. In 1941, an Agreement was entered into by the Governments of Canada and Ontario, under which Ontario agreed to pay \$64,125,000 for the Ontario share of the hydro-electric power development in the International Rapids Section. (This figure did not include the purchase and installation of power machinery and equipment, which was to be Ontario's responsibility). If the project were now to go forward, new arrangements would have to be concluded between the Canadian and Ontario Governments. In connection with the all-Canadian section of the project, the Canadian Government offered, in 1941, to pay the Government of Quebec \$7,972,550 for the facilities already constructed in the Beauharnois development which would be used as an integral part of the deep waterway.

### Developments during 1948

On February 27, 1948, the United States Senate re-committed Senate Joint Resolution 111 to its Foreign Relations Committee. This was the most recent measure designed to approve the 1941 Agreement, and the Senate's action removed any possibility that the Agreement would be approved during the life of the existing Congress.

A few weeks later, Governor Dewey of New York State, and Premier Drew of Ontario announced that their governments were prepared to undertake full power development in the International Rapids Section of the St. Lawrence River at their own expense, leaving navigation development -- which could be integrated with the proposed power development -- for later agreement between the two federal Governments. The plan was that the Power Authority of the State of New York and the Hydro-Electric Power Commission of Ontario would seek an order of approval for the undertaking from the International Joint Commission, under the Boundary Waters Treaty of 1909. The New York and Ontario applications were submitted to the United States State Department and the Canadian Department of External Affairs in July, 1948. The New York Power Authority also made application to the United States Federal Power Commission for a license to carry out its part of the project, and hearings on this application were held in October. In December, the United States Administration decided not to approve the separate power plan, but to urge Congress to approve the combined navigation and power project. Since the new session of Congress opened at the beginning of January, 1949, President Truman has on three different occasions urged the approval of the combined project.

Arguments of Supporters of the Project

Those who support the waterway and power project argue that greatly increased economic development would result from its completion. In the past, transportation has been one of the basic economic problems on this continent, and the improvement of the natural advantages of the Great Lakes - St. Lawrence System has gone far towards resolving some of the difficulties in this field. The successive deepening of the various canals in the system has regularly been followed by an increased flow of goods, taking advantage of the resulting transportation economies. It is argued that the deepening of the present 14-foot canals in the lower part of the system, to accommodate economical deep-draft vessels, would result in a similar development. Industrially, the joint development of power and navigation would encourage expansion and development in the tributary area, and indirectly throughout a large part of Canada and the United States.

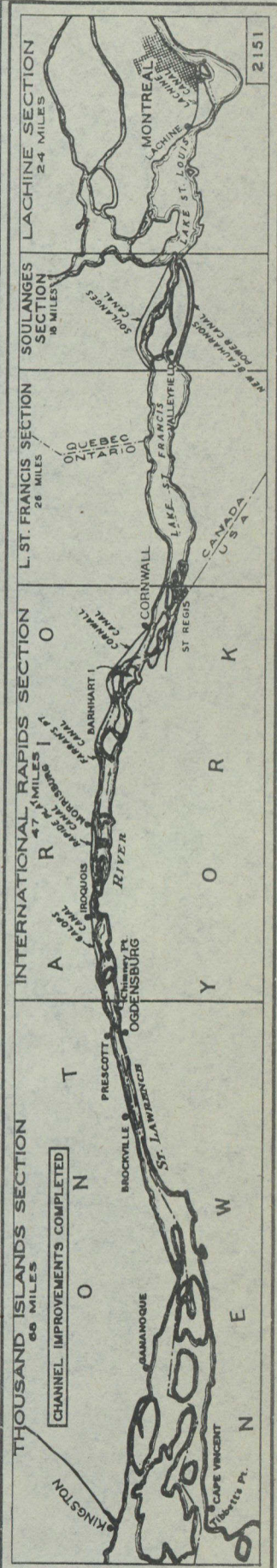
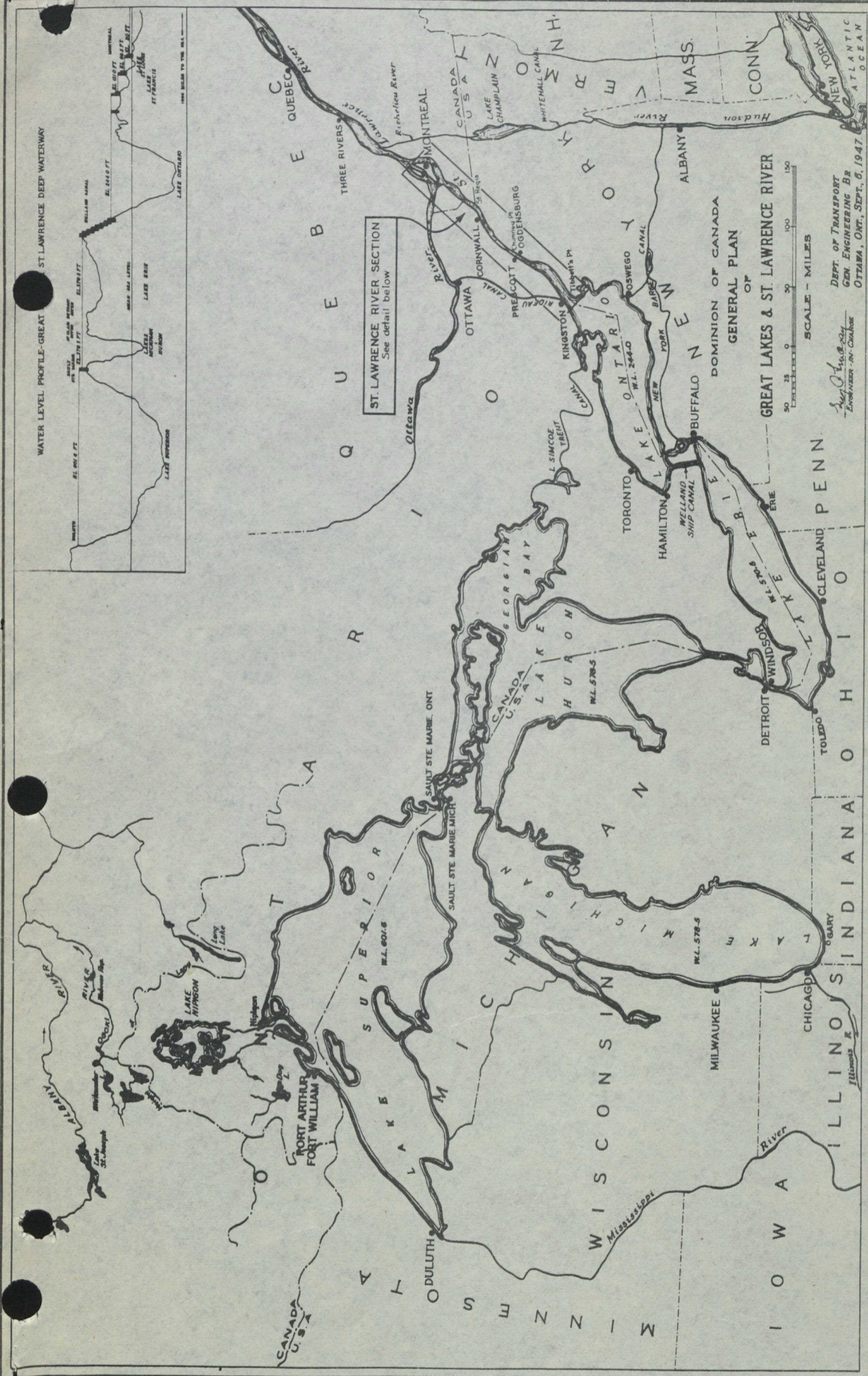
Quebec - Labrador Iron Ore Discoveries

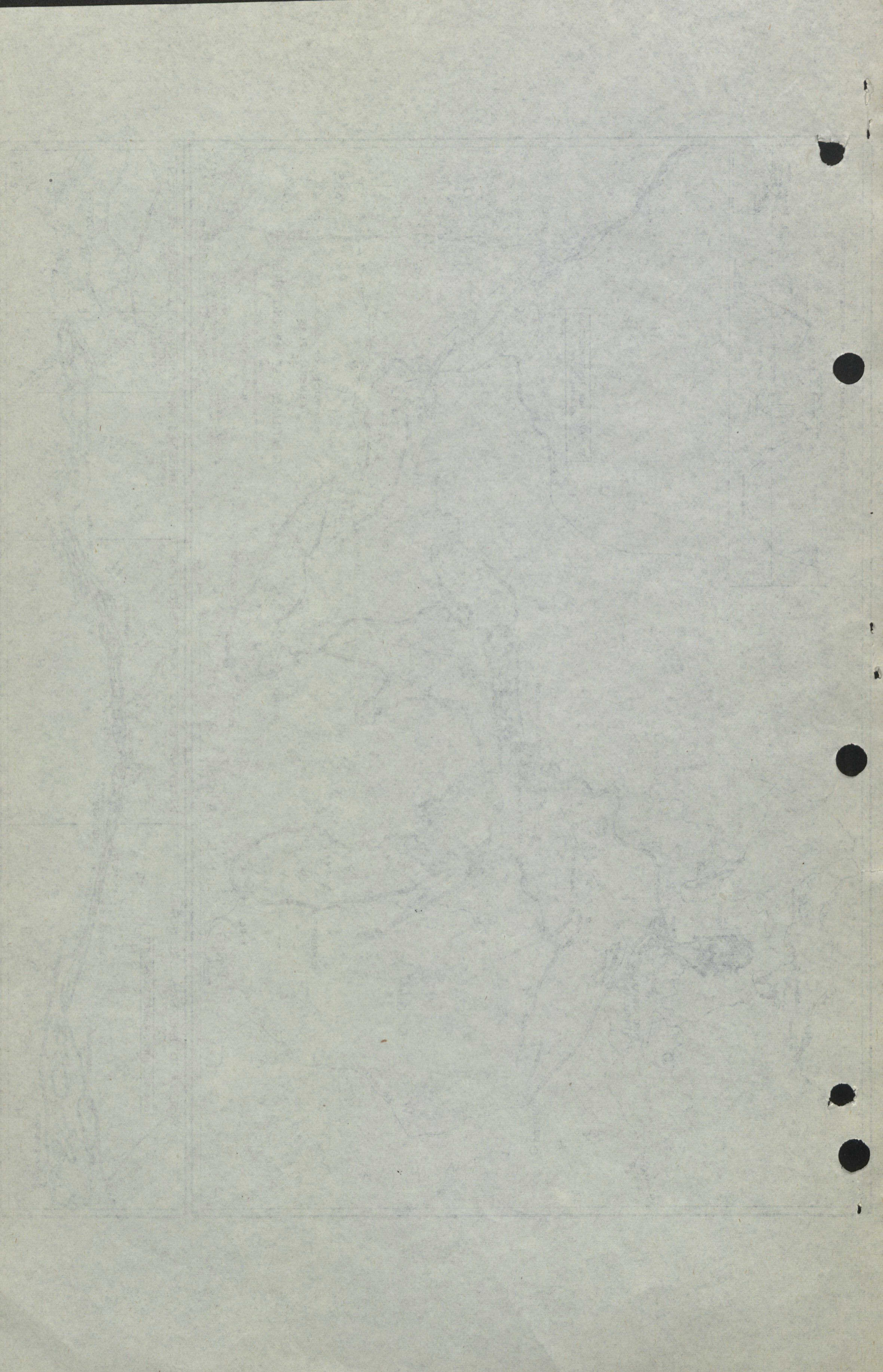
A new and important factor in current consideration of the St. Lawrence project, and one which has secured influential backing for the project in the United States, is the discovery of very large reserves of high-grade iron ore in the Quebec - Labrador region. It is claimed that the most economical route for this ore would be via the deepened waterway to Cleveland and other Great Lakes ports.

Defence Considerations

The project has also been receiving recent consideration from the standpoint of defence. The arguments in favour of it are many: a short, protected route from the heart of the continent to overseas ports; greater industrial development in the less vulnerable inland areas; greater dispersal of facilities vital to the industrial defence potential; greatly enlarged facilities for the construction of naval and merchant shipping. In this connection, it is interesting to note that the Permanent Joint Board on Defence, United States - Canada, has on more than one occasion recommended the early completion of the waterway and power project.

January 31, 1949  
RP/C







GREAT LAKES - ST. LAWRENCE BASIN DEVELOPMENT

NAVIGATION FEATURES

Section	Total Length Ft. William to Belle Isle Miles	Average diff. in level Ft.	Average flow C.F.S.	Navigation Works						Movable Bridge (a) No.	
				Existing		Proposed		Minimum Depth Ft.	Locks No.		
				Canal Miles	Minimum Depth Ft.	Locks No.	Movable Bridges No.				Canal Miles
<u>Upper Lakes Channels</u>											
Lake Superior	258.0	23	71,000	1.6	Downbound = 25 ft. Upbound = 21 ft.	1(b)	1	1.6	27	1(b)	1
St. Marys River	63.0	5	174,000	27.6		8	20	27.6		8	20
Lake Huron	219.0	3	194,000	12.0(c)		7(d)	3(e)	11.2		3	2
St. Clair River	39.0			14.7	14	5	8	15.5	2	4	
Lake St. Clair	18.0			8.7	14	5	11	11.2	2	2	
Detroit River	32.0										
Lake Erie	219.0										
Niagara River											
<u>Welland Ship Canal</u>	27.6	326		27.6	25	8	20	27.6	8	20	
<u>Lake Ontario</u>	155.4										
<u>St. Lawrence River (to Montreal)</u>											
Thousand Isd.	68.0	1			27						
Int. Rapids	47.0	92	237,000		14						
Lake St. Francis	26.0	1			14						
Soulanges	18.0	83	241,500		14						
Lachine	24.0	46	262,000		14						
<u>Lower St. Lawrence &amp; Gulf</u>	1,011.0	23			32.5						
<b>Totals</b>	<b>2,225.0</b>	<b>603</b>		<b>64.6</b>		<b>26</b>	<b>43</b>	<b>67.1</b>	<b>16</b>	<b>29</b>	

Notes:- (a) Bridges - Service Bridges at Locks not included.

(b) Only 1 lock at "Sault" is required to overcome the lift of 23 feet but there are 4 locks available on U.S. Side and 1 on the Canadian Side.

(c) (d) (e) Figures shown are for downbound route only. On upbound route there are 11.5 miles additional canal, 4 more locks and 2 more bridge

Minimum Lock Dimensions on completion of Deep Waterway will be 80 ft. wide - 860 ft. long - 30 ft. depth of water on sills.

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