74TH CONGRESS } COMMITTEE ON RIVERS AND HARBORS, { DOCUMENT
1st Session } HOUSE OF REPRESENTATIVES, U.S. { No. 1

COLUMBIA RIVER, BETWEEN MOUTH OF WILLAMETTE RIVER AND A POINT 1 MILE ABOVE VANCOUVER, WASH.

LETTER

FROM

THE CHIEF OF ENGINEERS, UNITED STATES ARMY

TRANSMITTING

REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS ON REVIEW OF REPORTS HERETOFORE SUBMITTED ON COLUMBIA RIVER, BETWEEN THE MOUTH OF THE WILLAMETTE RIVER AND A POINT 1 MILE ABOVE THE CITY OF VANCOUVER, WASH.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, July 17, 1934.

Hon. J. J. MANSFIELD,
Chairman Committee on Rivers and Harbors,
House of Representatives, Washington, D. C.

MY DEAR MR. MANSFIELD: 1. The Committee on Rivers and Harbors of the House of Representatives, by resolutions adopted January 2, 1934, and February 27, 1934, requested the Board of Engineers for Rivers and Harbors to review the reports on the Columbia River, between mouth of Willamette River and a point 1 mile above Vancouver, Wash., submitted in House Document No. 249, Seventy-second Congress, first session, with a view to determining whether modification is advisable to the extent of providing 32-foot depth channel B along Washington shore at Vancouver, Wash.; and to review the reports on the Columbia River, between mouth of Willamette River and a point 1 mile above Vancouver, Wash., submitted in House Document No. 249, Seventy-second Congress, first session, with a view to determining whether modification is advisable to the extent of deepening the present project channel A and extending lower turning basin another thousand feet down stream along Washington shore at Vancouver, Wash. I enclose herewith the report of the Board in response thereto.

2. The city of Vancouver is at the head of present deep-draft navigation on the Columbia River and is 4½ miles above the mouth of the Willamette River on which the port of Portland, Oreg., is

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located. The Columbia is under improvement below the mouth of the Willamette to provide a channel 35 feet in depth and 500 feet wide. From the mouth of the Willamette to Vancouver it has been improved to afford a channel 28 feet deep and 300 feet wide in accordance with the recommendations in the document under review with funds provided by the Public Works Administration. The channel is enlarged on the waterfront of the city of Vancouver to provide two turning basins, each generally 2,000 feet long and 800 feet wide. Below the lower turning basin the channel leaves the Washington shore and follows a course in midstream. The port of Vancouver now desires that the depths in the channels and turning basins be increased to 32 feet and that the location be changed to follow the Washington shore to afford additional frontage for terminal development. If the channel location is not changed, they desire that the lower turning basin be extended downstream for a distance of about 1,000 feet.

3. The city of Vancouver has a population of about 16,000 and is the only town on the stretch of the river under consideration. The port authorities have a wharf on the upper turning basin and are now constructing a grain elevator and shipping facilities on the lower turning basin. Increased depth of the channel is desired in order that deep-draft grain-laden vessels may utilize this grain elevator. The ocean-going commerce of Vancouver reached a maximum of 176,000 tons in 1928, declining to 85,000 tons in 1932, and increasing to 93,000 tons in 1933. It consists chiefly of shipments of lumber and lumber products and canned goods. The port officials estimate that the construction of the new grain elevator will result in the shipment of 300,000 tons of grain annually.

4. The district engineer estimates that the cost of deepening the channel and turning basins, and relocating the channel as desired by local interests would be $381,000, and that the annual maintenance would be $75,000. The cost of deepening the present channel and the two turning basins to 32 feet, and extending the lower turning basin 1,000 feet downstream, is estimated at $264,000 with $75,000 annually for maintenance. He does not consider that either plan is economically justified. He estimates that not more than one or two boats a year in the general cargo or grain trade will require more than 28 feet of water, and states that these boats can use the present channel even during the low-water season by taking advantage of favorable tides. He does not consider that any modification of the existing project is advisable at this time.

5. The division engineer, while not regarding the extensive improvements desired by local interests as now justified, is of the opinion that it will be impossible to make full use of the grain terminal now under construction at a cost of about $1,000,000 unless the project depth is increased to at least 30 feet. He estimates the cost of this work at $140,000, of which $75,000 is for dike construction and $65,000 for dredging. He considers that the dike construction is advisable to lessen the shoaling of the present channel, and believes that with the proposed dikes the maintenance of the 30-foot channel will be no greater than that of a 28-foot channel. He recommends that the project be modified accordingly.

6. The Board of Engineers for Rivers and Harbors has carefully considered the reports of the district and division engineers, has inspected the locality on May 30, and has considered a brief presented by the Board of Port Commissioners of the Port of Vancouver and the Vancouver Chamber of Commerce, supplemented by oral statements. It points out that the mean annual stage of the river at Vancouver is 5 feet above low-water datum and for about 8 months the stage of low tide is at and above 3 feet. At low-water stage the tidal range is from 1½ to 2½ feet. At Portland, where the cargo tonnage vastly exceeds that of Vancouver and the channel depth is 35 feet, but 42 trips were made in 1932 by vessels having a draft of over 28 feet, and only 1 with a draft of over 30 feet. A large proportion of these deep-draft vessels were oil tankers. In view of these facts, the Board concurs in the views of the district engineer that a greater depth than that now available is not essential to the successful movement of grain from Vancouver, even though such shipments are ordinarily made during the low-water season, and that only occasional delays might occur for a few of the larger ships. In the absence of any present movement of this commodity and any demonstrated inadequacy of the existing channel, the Board is of the opinion that an increase in depth is not justified at this time.

7. After due consideration of these reports, I am unable to concur with the views of the Board. The city of Vancouver is constructing at large expense a terminal for the handling of grain at the port. It is appropriate that the Federal Government provide an adequate channel to this terminal, capable of safe navigation by the largest vessels likely to use it. These large vessels must have several feet of water under their keels to navigate with safety. The whole experience of the department indicates clearly that channels 30 feet in depth are necessary to afford unrestricted access to ocean trade. The expenditure of $140,000 proposed by the division engineer to provide an adequate channel appears reasonable and justified in the general interests of commerce and navigation. I therefore report that the modification of the project for the improvement of the Columbia River is advisable to provide a channel 300 feet wide and 30 feet deep from the mouth of the Willamette River to the interstate highway bridge at Vancouver, with two turning basins, each generally 2,000 feet long, 800 feet wide, and 30 feet deep, at an estimated cost of $140,000 for new work and with maintenance estimated at $35,000 annually, this being no increase in the present estimated cost of maintenance.

Very truly yours,

E. M. MARKHAM,
Major General,
Chief of Engineers.

REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS

WAR DEPARTMENT,
BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, June 26, 1934.

Subject: Columbia River, between mouth of Willamette River and a point 1 mile above Vancouver, Wash.
To: The Chief of Engineers, United States Army.

1. This report is submitted in response to the following resolutions adopted January 2 and February 27, 1934, respectively:

Resolved by the Committee on Rivers and Harbors of the House of Representatives, United States, That the Board of Engineers for Rivers and Harbors created under section 3 of the River and Harbor Act, approved June 13, 1902, be, and is hereby, requested to review the reports on the Columbia River, between mouth of Willamette River and a point one mile above Vancouver, Washington, submitted in House Document Numbered 249, Seventy-second Congress, first session, with a view to determining whether modification is advisable to the extent of providing thirty-two foot depth channel B along Washington shore at Vancouver, Washington.

Resolved by the Committee on Rivers and Harbors of the House of Representatives, United States, That the Board of Engineers for Rivers and Harbors, created under section 3 of the River and Harbor Act, approved June 13, 1902, be, and is hereby, requested to review the reports on the Columbia River, between mouth of Willamette River and a point one mile above Vancouver, Washington, submitted in House Document Numbered 249, Seventy-second Congress, first session, with a view to determining whether modification is advisable to the extent of deepening the present project channel A and extending lower turning basin another thousand feet downstream along Washington shore at Vancouver, Washington.

2. Vancouver, Wash., is located on the Columbia River 104 miles from the sea and 4½ miles above the mouth of the Willamette. Below the mouth of the Willamette the present project for the Columbia River provides for a channel with a depth of 35 feet and a width of 500 feet. From the mouth of the Willamette to the interstate highway bridge at Vancouver the existing project authorizes a channel in the Columbia 25 feet deep and 300 feet wide. In the report under review, the Chief of Engineers recommended a modification of the project to provide a channel 300 feet wide and 28 feet deep with two turning basins, each generally 2,000 feet long, 800 feet wide, and 28 feet deep, all at an estimated cost of $57,000, with $35,000 annually for maintenance. Although this modification has not been adopted by Congress, the work has been completed at a cost of $57,000 with funds made available under the provisions of the National Industrial Recovery Act.

3. Local interests as represented by the port of Vancouver desire that the depths of the channel and the turning basins be increased to 32 feet, and that the location of the channel be changed below the Spokane, Portland & Seattle Railway bridge so as to follow more closely the Washington shore. They claim that the increased channel depth is necessary to provide for all boats that are expected to use the waterway, and point out that upon the completion of the grain elevator now being built by the port of Vancouver, deeper draft ships may be expected to use the improvement. They claim that the relocation of the channel to follow the Washington shore is necessary to provide for the establishment of additional water terminal and industrial developments on deep water in the port area. If the channel location is not changed they desire that the lower turning basin be extended downstream for a distance of 1,000 feet.

VIEWS AND RECOMMENDATIONS OF THE DISTRICT ENGINEER

4. The report of the district engineer herewith contains more detailed information in regard to present conditions, existing navigation facilities, and the advisability of further improvement. He estimates that the cost of the work necessary to provide the channel and turning basins as requested by local interests would be $381,000 and that the annual maintenance would be $75,000, and of increasing the depth of the present channel and the two turning basins to 32 feet and extending the lower basin 1,000 feet downstream, $264,000, with $75,000 annually for maintenance. He does not believe, however, that there is economic justification for the adoption of either plan of improvement. He estimates that there will not be more than one or two boats a year in the general cargo or grain trade at the port which will require more than 28 feet of water, and states that these boats can use the present channel even during the low-water season by taking advantage of favorable tides. He believes that the proposed location of the channel along the Washington shore is undesirable from the viewpoint of navigation, as it would be difficult for a boat leaving a dock in the lower basin to enter the proposed channel. He thinks that a more satisfactory method of providing additional water frontage would be by an extension of the turning basin downstream rather than by relocating the channel, this to be undertaken only as the need develops. He does not consider that any modification of the existing project other than as recommended in the report under review is advisable at this time.

VIEWS AND RECOMMENDATIONS OF THE DIVISION ENGINEER

5. The division engineer does not concur in this view. He does not believe that the United States would be justified in undertaking the extensive improvements desired by local interests, but he does believe that it will be impossible to make full use of the $1,000,000 grain terminal now under construction unless the project depth is increased to at least 30 feet. He estimates the cost of this work at $140,000, of which $75,000 is for dike construction and $65,000 for dredging. He considers that the dike construction is advisable in any event to lessen the shoaling of the present channel, and believes that, with the proposed dikes, the maintenance of the 30-foot channel will be no greater than that of a 28-foot channel. He recommends the modification of the existing project to provide a channel 300 feet wide and 30 feet deep from the mouth of the Willamette to the interstate highway bridge at Vancouver, with two turning basins, each generally 2,000 feet long, 800 feet wide, and 30 feet deep, at an estimated cost of $140,000 for new work, and no increase in the present maintenance of $35,000 annually.

6. Local interests were advised by the division engineer of the partially unfavorable character of his report and given an opportunity to present their views to the Board. On May 30 the Board inspected the locality and at that time a brief was presented by the Board of Port Commissioners of the Port of Vancouver and the Vancouver Chamber of Commerce, supplemented by oral statements, in which it was urged that the present channel be deepened to 32 feet and the lower basin extended at least 1,000 feet downstream. It was claimed that this is necessary to serve the present shippers; to enable grain

cargoes to move without limitation; to secure terminal rates on general cargoes; to make Vancouver, which is the nearest seaport to the Bonneville Dam, attractive to the industries expected to use the power therefrom; and to enable the Vancouver industrial properties and terminals to compete with those of Portland on more nearly even terms.

VIEWS AND RECOMMENDATIONS OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS

7. The Board concurs in the view of the district and division engineers that it is not advisable to change the location of the channel below the Spokane, Portland & Seattle Railway bridge. The only resulting benefit would be that additional land would be afforded ready access to deep water and become more available for terminal and industrial development. The same result can be obtained more satisfactorily, when further development may warrant the cost of the improvement, by the extension downstream of the lower turning basin. There is no indication that this is required at present.

8. The ocean-going commerce of Vancouver is not large. It reached a maximum of 176,000 tons in 1928, declined to 85,000 tons in 1932, and increased to 93,000 tons in 1933. It consists chiefly of shipments of lumber and lumber products and of canned goods. Receipts, chiefly sugar, sulphur and petroleum products, are small in amount. In the report under review the Board recommended an increase in depth from 25 to 28 feet and expressed the opinion that such increase would be ample to accommodate practically all vessels which might desire to call at Vancouver for many years. As previously stated, this increased depth has now been provided under allotment from the Public Works Administration, the work having been completed in December 1933. The Board finds no grounds for changing its previously expressed opinion that this depth will be sufficient for present and prospective commerce of the character now handled at this port.

9. The only change in conditions since the previous reports that appears to require serious consideration is the recent construction of a new grain elevator and shipping facilities, located on the lower turning basin. It is estimated by the local port officials that this will result in the shipment of 300,000 tons of grain. The Board has some doubts as to the development of such a tonnage and as to any resulting benefits to the general public; but in any event it is not convinced that this development is dependent upon the provision of a deeper channel.

10. The district engineer points out that a large part of this tonnage must come from a diversion from the present grain terminals at Portland and that there would apparently be little saving to the public effected by the change from one terminal to the other, since the rail rates to the two ports from the grain-producing territory are the same. The railroad would save the cost of the haul to Portland and the switching charges there. Local interests estimate that 60,000 tons of the grain would come by barge from the upper Columbia with a saving of 50 cents per ton over the rate to Portland. Based upon present barge movements of grain on the Columbia, the Board considers this estimate of tonnage excessive and, as the distance from the Vancouver grain terminal to Portland elevators is only 8 to 16 miles of easy navigation, concurs in the view of the district engineer that the actual saving would be less than 17 cents per ton.

11. The mean annual stage at Vancouver is 5 feet above zero and for about 8 months the stage at low tide is at and above 3 feet. At low-water stages the tidal range is about 1.5 and 2.5 feet for neap and spring tides, respectively. At Portland, where the cargo tonnage handled is over 40 times that at Vancouver and the channel depth is 35 feet, there were in 1932 only 42 trips of vessels having a draft of over 28 feet and only 1 with a draft of over 30 feet; and a large proportion of the deep-draft vessels were oil tankers. In view of these facts, the Board concurs in the views of the district engineer to the effect that a greater depth than that now available is not essential for the successful movement of grain from Vancouver even though such shipments are ordinarily made during the low-water season, and that only occasional delays might occur for a few of the larger ships. In the absence of any present movement of this commodity and any demonstrated inadequacy of the existing channel, it is clearly of the opinion that an increase of depth is not justified at this time.

12. The Board therefore reports, in response to the committee resolutions, that modification of the recommendation for a depth of 28 feet as contained in the document under review, either to the extent of providing a 32-foot depth along the Washington shore or of deepening the present channel and extending the lower turning basin a thousand feet downstream, is not advisable at the present time.

For the Board:

W. J. BARDEN,
Colonel, Corps of Engineers,
Senior Member.

REPORT OF THE DIVISION ENGINEER

SYLLABUS

The division engineer recommends modification of the existing project for Columbia and Lower Willamette Rivers, below Portland, Oreg., and Vancouver, Wash., so as to provide a channel 300 feet wide and 30 feet deep, at low water, from the mouth of the Willamette River to the interstate highway bridge at Vancouver, with two turning basins, each generally 2,000 feet long, 800 feet wide, and 30 feet deep at low water, all at an estimated additional cost of $140,000 for new work. No additional cost for maintenance will be involved.

WAR DEPARTMENT,
OFFICE OF THE DIVISION ENGINEER, PACIFIC DIVISION,
San Francisco, Calif., April 21, 1934.

Subject: Review of reports on Columbia River between the mouth of the Willamette and a point 1 mile above Vancouver, Wash.

To: The Chief of Engineers, United States Army.

AUTHORITY

1. Review of reports on the Columbia River between the mouth of the Willamette River and a point 1 mile above Vancouver, Wash., submitted in House Document No. 249, Seventy-second Congress, first session, with a view to determining whether modifications are advisable to the extent of providing 32-foot depth in channel B along

the Washington shore at Vancouver, and to the extent of deepening the present project channel A and extending the lower turning basin another thousand feet downstream along the Washington shore, were requested by the Committee on Rivers and Harbors in resolutions adopted January 2, 1934, and February 27, 1934. The report of the district engineer is enclosed.

DESCRIPTION

2. Vancouver, Wash., is situated at the head of deep-water navigation on the Columbia River, about 104 miles from the sea and 4½ miles above the mouth of the Willamette River. The locality is shown on United States Coast and Geodetic Survey Charts Nos. 6154 and 6155 and on the map [1] accompanying the district engineer's report. In front of Vancouver the natural river width is about 3,000 feet with depths varying from 10 to 28 feet at low water. The low water flow is about 70,000 second-feet. During annual freshets, ordinarily occurring in May, June, and July, the river rises to an average crest of 21 feet, at which time the discharge is about 680,000 second-feet. During low-water stages the tidal range is from 1.5 to 2.5 feet. Two bridges cross the Columbia River at Vancouver. One is an interstate highway bridge located above Vancouver Harbor and has a lift span with horizontal clearance of 200 feet and vertical clearance of 175 feet. About 4,500 feet downstream of the highway bridge there is a double track railroad bridge with a swing draw, each opening having a clear width of 200 feet.

EXISTING PROJECT

3. The existing project for the Columbia and Lower Willamette Rivers as adopted by Congress provides for a channel 500 feet wide and 35 feet deep from the entrance to Portland and for a channel 300 feet wide and 25 feet deep from the mouth of the Willamette River to Vancouver. A modification of the project recommended by the Chief of Engineers and printed in the document under review provides for a channel 300 feet wide and 28 feet deep from the mouth of the Willamette River to the interstate highway bridge with two turning basins, each generally, 2,000 feet long, 800 feet wide, and 28 feet deep. This improvement has been included in the Public Works program under the National Industrial Recovery Act and the new work was completed in December 1933, at a cost of $56,984. The estimated annual cost of maintenance is $35,000.

4. Local interests of Vancouver have contributed $98,527 toward channel improvement and maintenance and are obligated for a total of not to exceed $123,000.

TRIBUTARY AREA

5. Vancouver, with a population of about 16,000, is the only town on the stretch of the river under consideration. It is the trading center and shipping point for a territory devoted to lumbering and agriculture. Vancouver water front occupies the upper 7,500 feet of the project channe.l The port authorities have a wharf 1,325 feet long on the upper turning basin and are constructing a grain elevator

[1] Not printed.

and shipping facilities on the lower turning basin. The remainder of the waterfront is occupied by privately owned wharves and manufacturing plants.

6. Vancouver is about 8 miles north of Portland, Oreg. The main lines of the Northern Pacific Railway from Portland to Tacoma and of the Seattle, Portland & Spokane Railway from Portland to Spokane, cross the Columbia River at Vancouver. The Pacific Highway also crosses the river at Vancouver and the Evergreen Highway extends along the north bank of the Columbia River from Vancouver to the east.

COMMERCE

7. The vessel traffic for Vancouver Harbor for 1932 was 85,331 tons and that for 1933 is reported as 104,147 tons by the port of Vancouver. The largest tonnage of any year was 176,046 in 1928. Shipments of lumber, wood products, and paper accounted for 65,290 tons of the 1932 vessel traffic. In addition to the vessel traffic there is a large quantity of rafted logs. The record of trips and drafts of vessels for 1933 shows 203 each of arrivals and departures with drafts of from 10 to 27 feet, most of which range from 16 to 24 feet. Transcontinental terminal rates are in effect for all classes of commerce.

IMPROVEMENT DESIRED

8. Local interests represented by the port of Vancouver desire that the depth of the channel and turning basins be increased from 28 to 32 feet, that the length of the lower turning basin be extended 1,000 feet downstream and that the location of the channel below the lower turning basin be moved to the Washington shore.

9. The port of Vancouver claims that the drafts of grain carriers expected to use the new port facilities are about 30 feet, therefore a 32-foot minimum depth of channel is required. As a reason for enlarging the lower turning basin and moving the channel to the Washington shore they point out that all of the existing frontage on the channel and turning basin is now occupied, that additional facilities are required, and that no further industrial expansion can take place because of the limited frontage now available. The prospective benefits to be gained by the proposed improvements have been evaluated by the port as follows:

Savings to shippers on account of terminal rates at Vancouver	$55,000
Savings on grain barged down the Columbia River at Vancouver	30,000
Savings on towboat expense	6,000

The saving of $55,000 is based on the assumption that unless a depth of 32 feet is established and additional facilities are provided for deep-draft shipping Vancouver will lose its classification as a terminal port. The saving on grain is computed at 50 cents per ton as the additional cost of carrying 60,000 tons of grain to Portland. Enlargement of the lower turning basin is expected to eliminate or reduce the need for towing. No offers of further local cooperation have been made.

SPECIAL SUBJECTS

10. Except for the question of land reclamation there are no subjects so related to the proposed improvement that they could be coordinated therewith so as to lessen the costs chargeable to navigation.

VIEWS AND RECOMMENDATIONS OF THE DISTRICT ENGINEER

11. The district engineer has made a survey including jet borings in the area of the desired improvements. On the map with his report are shown the results of the survey and the outlines of the proposed plans of improvement to meet the desires of local interests. The estimated cost for the work under these plans is summarized below:

Realinement of channel below the lower turning basin at depth of 28 feet

First cost:	
Dredging	$306,000
Dikes	75,000
Total	381,000
Maintenance	75,000

(No estimate has been made for the above improvement to depth of 32 feet.)

Increasing depths to 32 feet and extending lower turning basin 1,000 feet

First cost:	
Dredging	$189,000
Dikes	75,000
Total	264,000
Maintenance	75,000

12. The district engineer discusses the contentions of local interests and concludes that the present depth of 28 feet will accommodate practically all of the vessels that might desire to enter the harbor and that the total cost of delays to deeper draft vessels would be about $1,000 per year. Since the port was granted terminal rates when the project provided for 25-foot depth the district engineer sees no reason to expect any increase in rates with the 28-foot depths now provided. The possible annual savings on the barging of 60,000 tons of grain down the river for reshipment at Vancouver as estimated by the port of Vancouver are considered excessive by the district engineer, who estimates that if the grain were barged to Portland the difference in cost of transportation on a mileage basis would be about 17 cents per ton, giving a total prospective saving of only $10,200. The district engineer states that from the standpoint of navigation, the present channel location is preferable to that along the Washington shore and he is of the opinion that the extension of the turning basin is not required at this time but that ultimately as the city grows and shipping is increased, it is probable that the whole harbor area will require deepening.

13. The district engineer recommends that no change be made in the project recommended by the Chief of Engineers as published in House Document No. 249, Seventy-second Congress, first session.

VIEWS AND RECOMMENDATIONS OF THE DIVISION ENGINEER

14. I concur in the conclusions of the district engineer that the United States would not be justified in undertaking the extensive improvements requested by local interests. However, as a practical proposition, it is not believed that full use can be made of the new $1,000,000 grain terminal unless the project depth is increased to at least 30 feet at low water. The estimated cost for new work involved in doing this is $140,000, of which $75,000 is for dike construction and $65,000 for dredging. With the dike construction, which is advisable anyway to lessen shoaling of the present channel, I do not believe it will cost any more to maintain a project depth of 30 feet than it will to maintain a project depth of 28 feet.

15. It is therefore recommended that the existing project for Columbia and Lower Willamette Rivers below Portland, Oreg., and Vancouver, Wash., be modified so as to provide a channel 300 feet wide and 30 feet deep, at low water, from the mouth of the Willamette River to the interstate highway bridge at Vancouver, with two turning basins, each generally 2,000 feet long, 800 feet wide, and 30 feet deep, at low water, all at an estimated cost of $140,000 for new work. There will be no additional cost for maintenance.

THOMAS M. ROBINS,
Lieutenant Colonel, Corps of Engineers,
Division Engineer.

REPORT OF THE DISTRICT ENGINEER

SYLLABUS

The district engineer does not consider the excavation and maintenance of a channel 32 feet deep and 300 feet wide, in location B with two turning basins as at present located, or the excavation and maintenance of a channel 32 feet deep and 300 feet wide, in location A, with the extension of the lower turning basin 1,000 feet downstream, to be economically justified, and recommends that no change be made at present in the previous recommendations, as contained in House Document No. 249, Seventh-third Congress, first session.

WAR DEPARTMENT,
OFFICE OF THE DISTRICT ENGINEER,
Portland, Oreg., March 2, 1934.

Subject: Review of survey report on Columbia River between mouth of Willamette River to a point 1 mile above Vancouver, Wash.
To: The Division Engineer, Pacific Division, San Francisco, Calif.

AUTHORITY

1. Under authority of a resolution of the Committee on Rivers and Harbors of the House of Representatives, United States, adopted January 2, 1934; instructions from the Chief of Engineers dated January 10, 1934; and radiogram, Chief of Engineers, dated February 27, 1934, the following report is submitted.

2. The committee resolution on which the report is based is as follows:

Resolved by the Committee on Rivers and Harbors of the House of Representatives, United States, That the Board of Engineers for Rivers and Harbors created under section 3 of the River and Harbor Act, approved June 13, 1902, be, and is hereby, requested to review the reports on the Columbia River, between mouth of Willamette River and a point one mile above Vancouver, Washington, submitted in House Document Numbered 249, Seventy-second Congress, first session, with a view to determining whether modification is advisable to the extent of providing thirty-two foot depth channel B, along Washington shore at Vancouver, Washington.

For reference to committee resolution of February 27, 1934, see paragraph 26 of this report.

GENERAL DESCRIPTION

3. Vancouver, Wash., is situated on the Columbia River about 104 miles from the sea and 4½ miles above the mouth of the Willamette River. The drainage area of the Columbia is about 259,000 square miles. In front of Vancouver the natural river width is about 3,000 feet, with depths of water varying from about 10 to 28 feet at low water. The banks, about 20 feet high, are of sandy loam along Hayden Island (see map),[1] while on the Washington shore there is a fairly stiff clay substratum under the topsoil. The bottom is principally coarse sand, with an area of clay and gravel along the Washington side below the Spokane, Portland & Seattle Railway bridge. Land along the banks of the river is devoted to dairying and fruit raising, with general farming and timbering in the territory back from the river, in the State of Washington. Hayden Island, which has a heavy growth of willow and cottonwood brush, is not used to any extent, except for an area near the east end where there is a pleasure resort. The locality is shown on Coast and Geodetic Survey Charts Nos. 6154 and 6155 and map [1] submitted herewith.

4. The low-water flow of the Columbia River past Vancouver is about 55,000 second-feet, in addition to about 15,000 second-feet which passes down Oregon Slough on the southwest side of Hayden Island. During annual freshets, occurring ordinarily in May, June, and July, the river rises to an average crest height of about 21 feet, at which time the discharge is estimated at 543,000 second-feet, in addition to about 137,000 second-feet carried by Oregon Slough. At low-water stages the tidal rise and fall at Vancouver varies from about 1.5 to 2.5 feet for neap and spring tides, respectively. The water is generally low during the fall and winter months and high in the spring and summer. The rise is due principally to melting snows in the interior. The mean annual stage of the Columbia at Vancouver is about 5 feet above zero, and for about 8 months of the year the stage at low tide is at and above 3 feet. During 4 months in the winter the stage may drop to near zero at any time. Floating ice in the winter, at times, obstructs the movement of river craft, but is rarely heavy enough to interfere with the movement of ocean-going vessels. The ice generally lasts for 10 days, but may occur more than once during the winter. The interstate highway bridge obstructs the movement of ice floes, so that, above the bridge, the ice is sometimes packed to a depth of several feet.

5. Two bridges cross the Columbia at Vancouver. At the upper end of the harbor, above the municipal dock, is the interstate highway bridge. This has a lift span with clear horizontal opening of 200 feet and vertical clearance of 175 feet at low water. There is at present no ocean-borne traffic through or above this bridge. About 4,500 feet below the highway bridge and below the existing port terminal facilities, a double-track railroad bridge crosses. This bridge has a swing draw with two openings, each 200 feet in width. The Northern Pacific, Great Northern, Spokane, Portland & Seattle, and Oregon-Washington Railroad & Navigation Co. all use this bridge.

6. Vancouver, Wash., is the only town on the stretch of the Columbia River under consideration. It is located about 4½ miles above

[1] Not printed.

the mouth of the Willamette River and is the present head of deep-water navigation on the Columbia River. The population of Vancouver, 1930 census, was 15,766. There are four banks, with deposits of about $5,000,000.

7. There is a fertile and resourceful territory tributary to Vancouver. The principal industries consist in manufacture of lumber, shingles, sash and doors, brooms, furniture, woolens, patterns, butter, pulp, and paper. Farm products produced locally consist of fruit, potatoes, grain, and livestock. There are three large packing plants for putting up fruit and vegetables, and large grain elevators are being constructed on the lower turning basin.

EXISTING PROJECT

8. The existing project provides for a channel 300 feet wide and 25 feet deep at low water in Columbia River from mouth of the Willamette to the interstate highway bridge at Vancouver, a distance of about 4½ miles, and was adopted by the River and Harbor Act of March 3, 1925. Modification of this project was recommended by the Chief of Engineers, February 12, 1932 (H. Doc. No. 249, 72d Cong., 1st sess.), to provide for a channel 300 feet wide and 28 feet deep at low water, with two turning basins. This modification has not been adopted by a river and harbor act, but work on same was authorized as a Federal project under the National Industrial Recovery Act.

Under this latter authority, the channel and turning basins have been dredged to a depth of 28 feet, at low water, at a cost of $56,984. The work was completed in December 1933. The estimated cost of maintenance of the 28-foot channel, in present location, and the turning basins, including interest charges, was $37,280 per annum.

9. The local interests at Vancouver have contributed $98,527.20 toward channel improvement and maintenance, and under the present approved project are obligated to a total of not to exceed $123,000. Terminal facilities, consisting of a quay wharf 1,325 feet long, with transit shed and rail connections, have also been constructed by local interests. Local interests have offered no further contributions toward channel improvement or maintenance.

IMPROVEMENT DESIRED

10. The improvement desired by local interests is the excavation of a channel 32 feet deep and 300 feet wide, from the mouth of Willamette River to the interstate bridge at Vancouver, with two turning basins and with the channel location below Spokane, Portland & Seattle Railway bridge changed so as to follow along the Washington side of the river. (Channel location B in H. Doc. No. 249, 72d Cong., 1st sess.) The change desired would increase the channel depth provided in the existing project by 7 feet and of the channel and turning basins as excavated under the National Recovery Administration project by 4 feet. Improvement of the channel upstream from the interstate highway bridge is not requested or desired at this time as there is no development or shipping in that part of the harbor.

COMMERCE

Vessel traffic

Year	Tons	Value	Year	Tons	Value
1929	158,596	$3,664,312	1932	85,331	$3,588,652
1930	100,524	3,046,239	1933 [1]	104,147	
1931	92,660	2,984,766			

[1] Information furnished by port of Vancouver for 1933.

Drafts of vessels, 1933

Draft (in feet)	Number of arrivals	Number of departures	Draft (in feet)	Number of arrivals	Number of departures
10 to 12	2	0	22 to 24	15	25
12 to 14	4	3	24 to 26	11	12
14 to 16	25	7	26 to 27	0	3
16 to 18	53	38	27 to 30	0	0
18 to 20	59	61			
20 to 22	34	54	Total	203	203

SURVEY

12. A survey of Vancouver Channel was made in January 1934 and several water jet borings were made in the channel location proposed along the Washington shore. Location of soundings and of the borings are shown on the chart [1] accompanying this report. The borings indicate the surface of hard material to be at depths of 15 to 27 feet below low-water datum. In dredging the turning basin below the railroad bridge, this hard material was encountered along the Washington shore and consists of a mixture of clay and gravel. It is very compact.

13. The excavation necessary to provide a channel 32 feet deep and 300 feet wide from mouth of Willamette River to interstate bridge at Vancouver, in location B, requested by local interests, and with two turning basins as at present located, will amount to 4,080,000 cubic yards. Of this amount, 980,000 cubic yards will be clay and gravel.

PLAN OF IMPROVEMENT

14. The work necessary, in addition to channel dredging, will include the construction of spur dikes for a considerable distance upstream from Vancouver to rectify the channel alinement and throw a greater volume of flow along the Vancouver water front, as was proposed in the survey report (H. Doc. No. 249, 72d Cong., 1st sess.), as necessary for a 30-foot channel depth. The probable locations of these dikes are shown on "alinement chart" on the map [1] accompanying this report.

15. The estimated cost of original work for the channel proposed on the basis of 1-foot overdepth is as follows:

Dredging 4,080,000 cubic yards, at average cost of 7½ cents per cubic yard	$306,000
Dike construction	75,000
Total	381,000

[1] Not printed.

Annual charges:	
Maintenance, dredging, and dikes	$75,000
Interest on first cost, at 4 percent	15,200
Total annual cost	$90,200

This estimated annual cost is about $52,900 more than that of the recommended 28-foot channel and basins as at present located.

DISCUSSION

16. As before stated, a 28-foot channel with two turning basins has been recommended by the Chief of Engineers (H. Doc. No. 249, 72d Cong., 1st sess.), and original work on this modification for the channel has just been completed with funds provided by the Public Works Administration. Since completion of this work, construction has been started on a large grain elevator and shipping facilities located on the lower turning basin. (See map.) These facilities, it is estimated by port officials, will increase the ocean-borne tonnage from Vancouver by about 300,000 tons (of grain), and the prospective total for the port is estimated by the port officials at 471,300 tons per annum. (See letter from port of Vancouver, dated Feb. 9, 1934, herewith.) A large part of this increase in tonnage will be a diversion from the grain terminals at Portland. The rail rates to the two points from the grain-producing territory are the same, so that there would apparently be little saving to the public effected by the change from one terminal to the other. The saving of transfer charges between Vancouver and Portland, on general cargo items, in comparatively small lots, were estimated by the port of Vancouver at $37,500 per annum. (H. Doc. No. 249, 72d Cong., 1st sess., pp. 27 and 31.)

17. Since the port of Vancouver has been declared a terminal port, to which shipping conference terminal rates apply, ship lines have to absorb any transfer charges for lighterage or other water movement on goods handled through the water terminals at Vancouver. The transfer charge would have to be borne by the shipper in cases where goods are transferred direct by truck from producer to ship terminal. When such transfer is made from Vancouver territory to wharf at Portland, the cost is about $1.25 per ton. The port estimates a total of $37,500 per annum as the cost of such transfer charges. There would apparently be no additional saving in this respect as a result of changing the channel depth from 28 feet to 32 feet, as the 28-foot depth is sufficient for the ordinary run of vessels calling for package freight.

18. In letter from port of Vancouver, dated February 19, 1934 (copy herewith),[1] reference is made to establishing and retaining terminal rates for the port of Vancouver. There does not appear to be any danger that the port will lose its terminal status, since this was established when the project depth was only 25 feet without turning basins, and has since been recommended for an increase to 28 feet with two turning basins (already excavated). Shipping lines inform this office that terminal rates are in effect on all classes of traffic, coastal, intercoastal, gulf, and foreign. It, accordingly, does not appear that any additional savings can be effected in this regard.

[1] Not printed.

19. Reference is also made to the prospective movement of 60,000 tons of grain by barge from points on the Upper Columbia to Vancouver instead of Portland on which the port estimates a saving of 50 cents per ton. The distance from the Vancouver grain terminal to Portland elevators is 8 to 16 miles of easy navigation, while the bulk of the barge movement is from a point above The Dalles, about 100 miles from Portland by water. The rate at present is $1.40 per ton. If we assume a differential, on the basis of distance alone, it would amount to about 17 cents per ton, or, a total of $10,200 on an estimated 60,000 tons. It is believed that the difference, if any, would be much less than this. It is not understood, however, where even this saving would be effected, as the grain terminals are already under construction on the basis of a recommended 28-foot channel depth and turning basins, and barged wheat can be stopped there irrespective of whether the ship channel depth is 28 or 32 feet, or is located along the Washington shore.

20. As to reduced towing charges, it is believed that there would be no saving as between a 28-foot channel with turning basins, and a 32-foot depth, as the need for towboat service is occasioned by the railroad bridge crossing the channel below the upper turning basin, and not by lack of depth.

21. There were three vessels calling at Vancouver, during 1933, which had drafts of 26 to 27 feet, none of heavier draft. River stages, however, were sufficient to admit much greater drafts during about 6 months of the year. At Portland, with over 40 times the cargo tonnage handled as at Vancouver and with a 35-foot channel, there were in 1932, 80 trips of vessels of 28 feet and over in draft, out of which 1 had a draft of 30 to 31 feet. A large proportion of the deep-draft vessels were oil tankers, so that on the basis of general cargo, there would probably have been only one ship of draft in excess of 28 feet which would have used the Vancouver Channel for general cargo or grain shipments should a depth of 30 to 32 feet have been available.

22. Assuming that the channel depth should be 2 feet greater than the loaded draft of steamers using it, there would have been no use made of channel depths to Vancouver in excess of 29 feet even at zero stage of the river. But, if it is assumed that there might be two vessels call at Vancouver during the low-water season of the year, which would require depths of 30 to 32 feet, they could have been accommodated by waiting for tide both entering and leaving, with a delay of not to exceed 6 hours in each case, or a total of 24 ship-hours. Such delays, it may be roughly estimated, would cost the owners about $1,000 per annum.

23. It, accordingly, is not apparent where any appreciable saving to the public would be effected by increasing the channel depth from 28 to 32 feet, or by changing the channel to location B, as requested.

24. The location of channel B immediately adjacent to the waterfront below Vancouver is not considered desirable from the standpoint of navigation, as it appears that it would be difficult for a vessel leaving a dock on the lower turning basin, or at points along the channel below, to turn around and then haul back to the Washington shore, in order to enter the channel below the basin. The more natural and easier course for a vessel, after turning around, would be to proceed down the channel in its present location, as a ship, after turning will ordinarily be nearer the west side of the turning basin. It appears that it would be necessary to use a towboat, in many cases, when currents are strong, in order to start vessels down the channel, if dredged in location B, as requested. The upper turning basin and channel below same will give some trouble in this respect, but it is impossible to remedy this situation on account of the location of the draw span in the railroad bridge. The alinement there is not so bad, however, as in the case below the bridge, on account of the bend in the river channel.

25. From the standpoint of navigation and handling vessels, it is believed that the present channel location is preferable to location B. The advantage of the latter location would be in providing deep water along the waterfront on the Washington side of the river. This frontage, below the turning basin, is as yet undeveloped, and it appears the cheaper and more satisfactory plan would be to extend the turning basin downstream as need develops for the use of additional frontage. Ultimately, as the city grows and shipping is increased sufficiently, it is probable that the whole harbor area will require deepening.

ALTERNATE PLAN OF IMPROVEMENT

26. The following radiogram, dated February 27, 1934, was received from the Chief of Engineers through the division engineer subsequent to the preparation of the preceding paragraphs:

> Committee on Rivers and Harbors by resolution this date requests review report Columbia River between mouth Willamette and point 1 mile above Vancouver with view to determining whether modification is advisable to extent of deepening present project channel A and extending lower turning basin another thousand feet down stream along Washington shore at Vancouver, Wash.

27. The cost of increasing the depth of the present channel (in location A) and the turning basins to 32 feet, and extending the lower turning basin downstream 1,000 feet, is estimated as follows:

Dredging 2,600,000 cubic yards sand, and 100,000 cubic yards clay and gravel; total, 2,700,000 cubic yards, at 7 cents per cubic yard	$189,000
Dike construction	75,000
Total	264,000
Annual charges:	
Maintenance, dredging, and dikes	75,000
Interest on first cost, at 4 percent	10,560
Total	85,560

28. The annual cost on this basis would be $47,280 more than the estimated cost of a 28-foot channel and basins, as recommended in House Document No. 249, Seventy-second Congress, first session.

29. The discussion and arguments as to possible savings presented in the foregoing report on channel location B apply also in this case. Channel location A is considered to be preferable to location B, as stated in paragraphs 24 and 25 of report, and the annual costs to the United States would not be so great. The extension of the lower turning basin 1,000 feet downstream and the use of channel A would obviate the necessity of using towboats to turn around, as might be necessary with the channel in location B. Such extension would also open up 1,000 feet more water front for future development. It is

owever, that any savings to the public which might be his case, as in the case of channel location B, are not warrant such change being undertaken at this time.

RECOMMENDATION

istrict engineer is of the opinion that the cost of increas- ct depth in the Vancouver Channel to 32 feet and chang- tion to the Washington side of the river below the Spo- nd & Seattle Railway Co. bridge, or increasing the present h to 32 feet and extending the lower turning basin 1,000 eam, is not economically justified at the present time, ends that no change be made in the project approved by Engineers, as contained in House Document No. 249, nd Congress, first session.

C. F. WILLIAMS,
Major, Corps of Engineers,
District Engineer.

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