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***CITY OF PORTLAND  
MAYOR & COMMISSIONERS  
SHOWING OCT., 5<sup>TH</sup> 1943  
ON CITATION BY  
STATE SANITARY AUTHORITY***

SHAW-WALKER

*7084-7*

## EXHIBITS

- I. Board of Review (Wolman) Report
- II. Charter Amendment
- III. Ordinance No. 71912 Creating Board of Equalization
- IV. Resolution No. 21576, Appointing Board of Equalization
- V. Rate Recommendations by Board of Equalization
- VI. Report of Commissioner of Public Works on Rate Schedule
- VII. Ordinance No. 74011, Establishing Sewer User Service Charge
- VIII. Statement of Receipts and Disbursements from Sewer User Service Charge
  - (a) Summary
  - (b) Total Receipts by Year
  - (d) Detailed Account of Public Works Engineering Expenditures
- IX. See Board of Review (Wolman) Report, Exhibit I, Page 5, for brief history of previous progress.
- X. Summary of work accomplished on ten immediate steps recommended in Board of Review (Wolman) Report. Pages 25 and 26.



Portland, Oregon, October 5, 1943.

To Oregon State Sanitary Authority:

Re: Portland sewage disposal

Pursuant to citation issued by the Authority under date of September 20, 1943, the undersigned appear and show the facts to be as follows:

The City of Portland and its commissioners are not consciously obstructing the work of the Sanitary Authority but are cooperating. There may be a difference of opinion between the members of the Sanitary Authority and the city commissioners relative to some detail and method in the matters of plans and financing, but their objective is the same.

PROGRAM FOR CONSTRUCTION PLANS

The project involves a construction of intercepting sewers, pumping plants, treatment plant and outfalls to the river. Exhibit I hereto attached entitled "Report on the Collection and Disposal of Sewage" by R. H. Corey, Wellington Donaldson, Carl E. Green and Abel Wolman, dated August 19, 1939, (commonly known as the Wolman report) shows in a summary manner the history of the project up to that date, the practices elsewhere in the United States concerning sewage disposal, the controlling criteria for selection of type of treatment, ap-

plication to Portland, the main collection system for this city, estimated cost of construction and operation, recommended location, type of treatment, recovery and sale of sludge, methods of financing, and the steps which the engineers recommended for bringing about construction.

The immediate steps recommended include:

(a) The determination of flows in all of the trunk sewers with particular reference to minimum rates of flow and maximum rates.

(b) A detailed investigation of the present and ultimate population and industrial densities in each of the main intercepting areas.

(c) An evaluation of present and future population and industrial densities in outlying areas within and without the city limits.

(d) Field and laboratory investigation of the character and quantity of industrial and domestic wastes contiguous to the sewers.

(e) The study of the possibility and practicability of constructing sewers of the separate type in critical areas so as to reduce continuous and recurring pumping charges and to make greater use of high level gravity interceptors.

(f) The investigation of the detailed hydraulics of high level gravity and low level pumping interceptors.



(g) The investigation of the number, location and type of storm water diversion regulators and screens.

(h) The investigation of the existing sewerage system in order to prepare a schedule of replacements of portions of the system, obsolescent either because of physical condition or inadequate size.

(i) A comprehensive study of the engineering design and of the estimates of cost for a sewage treatment plant on the Columbia river.

(j) Adequate borings for interceptor tunnel locations, sites of pumping stations and treatment plant and river crossings.

Since the making of said report the City of Portland and its commissioners have been diligently taking the steps indicated. The nature of the work is such that some phases of it can be carried forward only during certain seasons of the year. This is true because of the fact that our sewers are of the double purpose type. They carry both sewage water and water from streets, roofs and elsewhere. The national defense and wars have caused a shortage of help in the matter of gathering data and preparing plans, and have altogether prevented construction in the immediate future. Nevertheless, the gathering of data has been pushed forward.

Exhibit X shows the work that has been thus far accomplished. It is summarized as follows:

(a) Sewage flow: The field work on the maximum and minimum dry weather flows in all of the trunk sewers has been completed. In this work over 11,000 daily charts have been prepared showing the flow in 48 trunk sewers. The work of tabulation for the purpose of calculating the daily flow of sewage within 15-minute intervals is approximately 31 per cent complete.

(b) and (c) Population study: Based on the 1940 census the population of the district drained by each trunk sewer has been ascertained. Studies have been and are still in progress to prognosticate population trends and the ultimate load to be carried by each of the trunk sewers and thus ascertain the required size of intercepting sewers, pumping plant, treatment plant, etc. This work is estimated as 75 per cent complete.

(d) Field and laboratory investigation: This work is extensive. It is estimated as probably 50 per cent complete.

(e) Practicability of constructing sewers of separate type: Owing to the fact that substantially all of our sewers are of the combined type the work and expense of new construction in order to separate sewage water from drainage water is considered to be so great that no special studies should be carried on under this heading.

(f) Detailed hydraulics of high level gravity and low level pumping: This phase of the project requires studies



on design and cost estimate for numerous possible interceptor locations with a general report on each. The work is estimated about 60 per cent complete.

(g) Storm water diversion regulators: The number, location and type of these regulators have been investigated. A regulator of original design thought to be required by local conditions has been constructed and operated on an experimental basis. This portion of the work is estimated as 25 per cent complete.

(h) Schedule for replacement of existing sewer system: No work has been done concerning this matter inasmuch as such replacements as become necessary will have no bearing upon the cost of intercepting sewers, pumping plants, etc.

(i) Engineering design and costs: Only preliminary studies have been made,-- estimated as 10 per cent of the whole.

(j) Borings for interceptor tunnels: Nothing has been done on this portion of the work.

In general it may be said that all of the studies are progressing and it is planned to complete them in time to have the construction plans and specifications ready as soon as war and financial conditions permit construction to be carried forward.

#### FINANCIAL PROGRAM

This portion of the project is of great magnitude because of the many vacant areas and wide extent of the city. Portland has been long known as a city of homes. It is

spread over a vast area. The result is that the cost of sewerage per capita of population has been high as compared with most other cities. This condition applies especially to the cost of constructing intercepting sewers, pumping plants and treatment plant. Moreover, the Willamette river bisects the city in its longest distance and thus renders necessary the construction of an intercepting sewer and pumping plants on each side of the river, whereas otherwise one intercepting sewer and pumping plants therefor would suffice.

A financing of this project is difficult also because little, if any, revenue will be derived from a sale of fertilizer, gas or other products. The financing must be based upon sewer user service charges, bond sale, taxation, and aid from the government or other sources.

The Wolman report shows an estimated cost for the sewage disposal system of approximately \$10,000,000.00. This estimate was based on costs as of the year 1939 and is subject to revision at the time construction is undertaken. The same is true of operating costs and fixed charges estimated by the engineers as amounting to \$794,000.00 per year.

The Wolman report stated that the project should be financed by a general obligation bond issue of approximately \$7,500,000.00, by a pay-as-you-go revenue from sewer user service charges and by an increase in the general tax



rate. Yet the charter amendment which provides for sewer user service charges contains no provision for bonds or for taxes. It must be remembered that on November 6, 1934 a proposed charter amendment was submitted to the people which provided for sewer user service charges and a bond issue for the project in an amount not exceeding \$6,000,000.00. This measure was defeated by a vote of 46,886 noes to 33,013 yeses.

On November 3, 1936, the project was again submitted to the people on the basis of a sewer user service charge which was definitely fixed at "33-1/3 per cent of the current water charge as annually fixed by the council \*\*\*." It was defeated by a vote of 75,841 noes to 34,328 yeses.

On November 8, 1938 the measure was submitted which is now section 9-604 of the charter. It received a vote of 64,934 yeses to 45,171 noes, but it contained no provision for a bond issue and it provided that the sewer user service charge "shall not exceed 33-1/3 per cent of the current water charge as annually fixed by the council," and, as above stated, it contains no provision for a tax.

From the above record it is apparent that the voters of this city are not inclined to approve taxation or a bond issue for the purpose of financing any part of

the project and they are not strongly in favor of sewer user service charges.

Certain statutory provisions are found which give municipalities in the state authority to construct sewage disposal projects by an application of "just and equitable" sewer user service charges, by a bond issue, or by taxation (see O.C.L.A. sections 95-1801, 95-1809, 95-1810, 95-1815, 95-1818, 97-401, 97-2101), but these statutory provisions are so drawn that little progress may be made without popular approval. Action under these statutory provisions is difficult also because of the small margin for an increase of taxation (see Oregon Constitution, Section 11, Article XI and Portland charter section 7-110).

The city commissioners, after their study of the financial problems and the probable cost of the project, have concurred in the view of the engineers, viz.: that the project should be financed in part by general obligation bonds, and in part by an application of just and equitable sewer user service charges, and aid by the government should be obtained. In fact sewer user service charges, if applied in the maximum amount, would be insufficient to warrant construction for an indefinite period in the future. This conclusion is especially apparent in view of the voting record above shown and the power of the people under the constitutional provisions concerning initiative legislation.

The city commissioners desire to have the project built at the earliest practicable date. They are of the



opinion that the object will be achieved quicker by applying moderate sewer user service charges for the present, seeking aid from the government as soon as the war emergency is over and submitting to the people a measure for authorizing a bond issue in conjunction with government aid. The commissioners feel certain that an application of the maximum amount permissible of sewer user service charges at this time would result in such popular disfavor that a bond issue would certainly fail of approval.

With a view of showing the members of the Sanitary Authority that the city commissioners have been diligently following the program set up by the engineers and have not wavered therefrom, we attach hereto a copy of the Auditor's register which shows the many documents which have come before the Council within the last two and one-half years and the action taken thereon (see Exhibit XII).

In view of the above it is urgently suggested that the Sanitary Authority concur in this program.

Respectfully submitted,

THE CITY OF PORTLAND

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Acting Mayor and Commissioner of  
Public Works

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Commissioner of Finance

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City Attorney for  
City of Portland

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Commissioner of Public Affairs

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Commissioner of Public Utilities

PORTLAND, OREGON

REPORT

on the

COLLECTION AND DISPOSAL

of

SEWAGE

August 19, 1939  
Portland, Oregon

BOARD OF REVIEW

R. H. Corey  
Wellington Donaldson  
Carl E. Green  
Abel Wolman

TO THE MAYOR AND COMMISSIONERS  
of the City of Portland, Oregon:

The Board of Review convened by you on August 6, 1939,  
has reviewed the sewage collection and disposal problem of Portland,  
Oregon.

It submits the enclosed report for your consideration.  
The report represents the unanimous judgment of the Board.

Very truly yours,

R. H. COREY

WELLINGTON DONALDSON

CARL E. GREEN

ABEL WOLMAN



LETTER OF ASSIGNMENT  
BY MAYOR AND COUNCIL

CITY OF PORTLAND  
OREGON

August 14, 1939

To the Board of Review for the  
proposed sewage treatment system  
for Portland, Oregon:

Mr. Abel Wolman  
Mr. Wellington Donaldson  
Mr. R. H. Corey  
Mr. Carl E. Green

Gentlemen:

In your investigations and report on a sewage treatment system for Portland, Oregon, the undersigned members of the City Council request that you include the following specific items:

- (a). A discussion on character of the water of the Willamette River as it is now and will be after treatment.
- (b). The type of treatment of sewage recommended.
- (c). The preferred location of treatment plant or plants.
- (d). An estimated cost of construction of main collection system.
- (e). An estimated cost of construction of treatment plant or plants.
- (f). Annual operating and maintenance cost for collection, pumping and treatment.
- (g). Recommended method of financing.
- (h). Recommended immediate steps for detailed design.
- (i). Technical type, character, number of personnel and estimate of cost of such detailed design.

Yours truly,

(Signed) Joseph K. Carson, Jr.  
Mayor  
(Signed) Wm. A. Bowes  
Commissioner of Public Works  
(Signed) R. E. Riley  
Commissioner of Finance  
(Signed) Ralph C. Clyde  
Commissioner of Public Utilities  
Commissioner of Public Affairs

## SUMMARY OF FINDINGS

The Board of Review records the following conclusions and recommendations:

1. The Willamette River during periods of low flow, normally during the summer months, is heavily polluted, unsafe for bathing, unsuitable for recreation purposes and impossible for sustained fish and aquatic life.

2. The City of Portland, through its various sewer outlets and the sewage resulting therefrom, is primarily responsible for this condition.

3. The Willamette River reaches the city limits in none too good condition. It should undoubtedly be relieved of a large part of its domestic and industrial waste load, discharged into it before it reaches the city.

4. The Columbia Slough is in worse condition than the Willamette River.

5. The unsatisfactory conditions on the Willamette and the Columbia Slough can be eliminated almost entirely by collection and by treatment processes. It is recommended that the sewage discharge from all of the outlets on the Willamette River and the Columbia Slough from the City of Portland and its immediate environs be collected and transported to a site in the vicinity of Columbia Slough, there to be treated by sedimentation, and then discharged into the Columbia River through multiple outlets.

6. Such a plan of collection and treatment will eliminate the objectionable conditions already noted and will create no detectable deleterious effects on the Columbia River.

7. The cost of the main intercepting system will be approximately \$7,900,000.

8. The cost of the treatment plant will be approximately \$2,387,000.

9. The cost of pumping, of operation, and of fixed charges will be annually approximately \$774,000.

10. The program should be financed by a general obligation bond issue of approximately \$7,500,000, by a pay-as-you-go revenue from sewer service charges and by an increase in the general tax rate.

11. Approximately \$150,000 should be made available at once for detailed field and office surveys and for design for the proposed program.



REPORT OF BOARD OF REVIEW

ON

THE COLLECTION AND DISPOSAL OF SEWAGE OF PORTLAND, OREGON

(August 19, 1939)

The sewage disposal problem of Portland, Oregon, has had a long and varied history. The discussions of various aspects of the local situation have covered a period of probably over twenty-five years. Since 1933, however, much more detailed attention has been given officially and publicly to the problem.

In the spring of 1933, a group of unemployed began a campaign looking toward the correction of the sewage disposal problem. This group prevailed upon the City Council to authorize the preparation of plans, estimates and specifications for this purpose. In six weeks such a plan was prepared and submitted to the Council on June 8, 1933. A special election was called for July 21, 1933.

The plans prepared in this interval were necessarily incomplete and rested upon no sound basis or estimate of sewage flow, size or location of main sewers, or adequate review of the local necessities for various degrees of treatment.

This preliminary and indefinite plan was hurriedly revised by the then City Engineer and re-submitted to the Council on July 12. The Council in receiving the revised program declared it to be "tentative only and would have to be changed, revised, added to as further study developed the need."

On July 21, 1933, a \$6,000,000 self-liquidating bond issue was passed by the people by a vote of 47,029 to 23,395.

During the campaign, statements were made as to service charges and sale of fertilizer. The record indicates that the people felt the bonds would be self-liquidating, either from service charges, or from revenues derived from sludge fertilizer sale, or both. Work relief features of the undertaking, however, probably supplied the principal motives for the passage of the bonds.

On August 4, 1933, an application for a loan of \$6,000,000 and a grant of \$2,000,000 was made to the Federal Emergency Public Works Administration on the basis of the still inadequate plans submitted to the Council on June 8 and July 12.

The application was immediately returned to the City by the P.W.A.



with the statement that "plans, estimates and specifications were insufficient to afford a proper checking of the application."

The Council attempted to obtain various amounts of money from different federal and state agencies with which to carry out the preparation of such plans, estimates and specifications. The cost of such preparation was estimated by the P.W.A. at approximately \$50,000.

The City succeeded in raising through its own auspices some \$10,000 in September, 1933. This fund, together with a small amount of money supplied by the Oregon State Reconstruction Advisory Board, provided limited funds for further study.

In July, 1934, a grant of \$2,240,000 was obtained from P.W.A., contingent on the sale of the \$6,000,000 bonds. No purchaser of these bonds could be found.

On September 15, 1933, Mr. Harrison P. Eddy, of Boston, was retained as consultant. He submitted his report on October 3, 1933. On October 25, 1933, Messrs. Koon, Cunningham and Dieck, local consulting engineers, were retained for further studies.

In November, 1933, the City submitted an application for \$50,000 for preparation of complete plans and a further application for a southeast unit of the intercepting sewer, at an approximate cost of \$461,000. The application was formally submitted on December 4, 1933, and immediately denied.

A complete application for the entire project, at a total cost of \$8,240,000 was submitted to P.W.A. on February 22, 1934.

Although it was accepted, no money was available because Oregon had at that time exceeded its allotment.

On November 6, 1934, a charter amendment was placed before the voters, adding a provision to the \$6,000,000 of self-liquidating bonds to the effect that the bonds would be supported out of the general tax funds in case of default in total service charges. This charter amendment was defeated.

During the latter part of 1935 and the early part of 1936, the Council proceeded through various steps to test the legality of the bonds. These steps were terminated on March 31, 1936, when the State Supreme Court handed down an opinion which in effect permitted the city to issue bonds and proceed upon the project as submitted to the Council on June 8, 1933. The opinion, however, carried several conditions, of which the most important were: (a) that all sewage except of Linnton shall be treated, and (b) that the activated sludge treatment be used for the entire sewage except of Linnton.

In order to clarify the various financial and legal complications, the Council submitted to the voters in the November, 1936 election, a pay-as-you-go amendment. It was defeated.

A charter amendment on a similar pay-as-you-go plan was again submitted to the Portland voters on November 8, 1938. On this occasion the voters accepted the enterprise with an assumed probable cost of approximately \$9,000,000.



This brief summary of the discussions during the past six years indicates that the assumed cost of the sewage collection and treatment program has risen from \$6,000,000 to approximately \$9,000,000, that at no time during this period has a detailed study of the enterprise been accomplished, and that apparently local understanding of the engineering plan and of the methods of financing is not yet completely clarified.

#### PRESENT CONDITIONS OF WILLAMETTE RIVER AND COLUMBIA SLOUGH

The Willamette River and the Columbia Slough receive virtually all of the domestic and industrial waste of the City of Portland and of the territory immediately adjacent to the city limits. We have had an opportunity to review a number of the past investigations of the conditions of these bodies of water. One or more field inspections have been made of each of the areas as well as of a considerable portion of the Columbia River above, at, and below the City of Portland. The records of field investigations, the field inspections by the present Board of Review and the calculations of the capacities of these various bodies of water for the reception of domestic and industrial waste make it perfectly clear that the pollution of the Willamette River by domestic sewage and industrial waste has converted it and the Columbia Slough into objectionable open sewers.

The most sensitive and perhaps the most important index to the character of these waters from a sanitary standpoint is their dissolved oxygen content. All of the investigations disclose the fact that the Willamette River and the Columbia Slough in the vicinity of the City of Portland have reached such a state of organic degradation as to prevent the existence of any except the most hardy forms of fish life, as to produce objectionable odors at many times during the summer, as to create objectionable sludge deposits and floating materials of obvious sewage origin, and as to interfere with the normal uses of the river for navigation, fish life, recreation, or bathing.

In other words, the character of the Willamette River and the Columbia Slough during a large part of the summer months leaves no doubt as to the objectionable and deleterious effects of the discharges of Portland domestic sewage and industrial waste. These waters are in bad condition and immediate steps for removing the major part of the contributing sewage and industrial waste from both areas is an obvious task for the community.

These conclusions of the present Board of Review are so amply and completely supported by prior investigations and by the findings and conclusions of all previous consultants or consulting boards that it is not felt that this point need be further labored. The Board assumes that the river is bad, that the Columbia Slough is worse and that corrective measures are essential in each.



## MEASURES NECESSARY TO CORRECT UNSATISFACTORY STREAM

### POLLUTION CONDITIONS

#### (a) Practice elsewhere in the United States

The problems confronting the City of Portland in respect to sewage disposal are not peculiar to Portland. This problem has vexed thousands of communities and millions of people in the United States. Considerable progress in treatment has, of course, been made in various areas in this country, even though the rate of correction may have been slow in this as well as in other communities. In 1938 approximately 41,000,000 people, or 52% of the urban population of the United States, were supplied with sewage treatment plants.

Almost 5,000 communities in 47 states had undertaken and were carrying on the treatment of sewage from their populations.

In New York State alone, the sewage of almost 6,000,000 people was being treated in 1938.

More than half of the communities treating their sewage provided treatment by sedimentation only. So-called complete or oxidation treatment has been used by 44% of the communities. Several hundred of the cities have been using activated sludge plants.

Disinfection of effluents prior to discharge into receiving bodies of water was employed in 1938 in only 20% of all the plants of the United States.

Literally thousands of plants had been equipped for sludge disposal through by-product utilization of one form or another. Of these thousands, more than 150 communities have been disposing of sludge, from either plain sedimentation tanks, activated sludge plants or chemical treatment plants for fertilizer use.

This brief summary of current sewage disposal practice in the United States shows that the problem is not new and that actual construction and operating data are available on a vast scale. It is equally important to emphasize the fact that data on costs, whether fixed or operating, are abundant in number and variety, so that there is no excuse for viewing the problems of the City of Portland on the basis of fantastic and fanciful figures lifted largely out of the imagination and rarely, if ever, checked against known principles, design data, or actual costs of construction and operation. The fund of experience on all of the elements necessary for reaching a decision for the City of Portland is tremendous in scope and character elsewhere in the United States. It is perhaps unsurpassed in availability of data anywhere else in the world.

It should be further pointed out, in reviewing the current practice in this country, that the methods of treatment adopted in the past have not been the result of chance or of whim. In thousands of instances, the degree of treatment in each local situation has been determined upon the basis of the character



and quantity of the sewage in question as balanced against the character, use and volume of the receiving body of water. In addition, the relative merits of the conclusions reached by this method have been balanced against the first cost and the annual operation and maintenance charges involved in the different types of treatment. In other words, the variation in method of treatment adopted in the different communities of the United States reflects the efforts of engineers and public officials to select for each community that most economical form of treatment made satisfactory for the protection of the sanitary, esthetic and biological necessities of the receiving body of water. Only upon such a basis can and should a decision be rendered.

(b). Controlling Criteria for selection of type of treatment.

What are the criteria which should be applied to any river in order to determine what degree of treatment is necessary and desirable to improve the quality of the river water receiving the untreated or treated discharges of domestic and industrial waste? Obviously, the most important consideration rests upon hygienic standards. In other words, a receiving body of water which is used for private or public supply intakes, for the production of natural ice, for the growing of shell fish, for the protection of migratory fish, or for the use of bathing beaches or recreational facilities, represents the highest uses to be protected in a treatment program.

Perhaps the second important consideration rests upon the avoidance of conditions affecting the public comfort, offensive either to the eye or to the sense of smell.

A third consideration, frequently of equal importance to those listed under hygienic values, involves the uses of the receiving body of water for economic values, such as industrial water supplies, the watering of live stock, the propagation of fish and other useful aquatic life, the protection of real estate values, and the safeguarding of private and public river and harbor improvements and navigation, so as to avoid the costly and objectionable effects of silting and sludge deposits.

A similar set of considerations must be borne in mind in relation to the law, with particular reference to the rights of lower riparian owners and users and to compliance and conformity with existing legal requirements of local, state and federal agencies.

All of these considerations must be reviewed in determining upon the logical method of collecting and treating the sewage of any important metropolitan population.

A generalization of these considerations would lead us to state that the choice of type and location of a treatment plant will be determined primarily by which of two groups of waters the community uses for the discharge of sewage. If it falls into a designated water area which is or is to be expected to be used primarily for water supply, for recreational purposes, for shell fish culture or for the development of fish life, it will require that degree of treatment which will not be detrimental to these uses. If, on the other hand, it is located



upon a designated water area which is not or is not expected to be used primarily for recreational purposes, shall fish culture, or the development of fish life, or for water supply intakes, a lower degree of treatment will be required, which will produce conditions in the water area unobjectionable for those uses of less importance.

The Board of Review has examined with care all of the considerations listed above and considers that the Willamette River, the Columbia Slough and the Columbia River fall within the first designated class. These water areas have important uses, which will be specified further below, which will require the discharge of effluents which will not disturb the uses already enumerated for a first class receiving body of water.

Experience throughout the country has indicated that the waters of such first class areas may be preserved in satisfactory condition when all floating solids and at least 60% of suspended solids have been removed from the sewage; when organisms of the B. coli group (bacteria of intestinal origin) have been so reduced as to not exceed one per cubic centimeter in more than 50% of the samples of sewage effluent during the bathing season; and when the average dissolved oxygen content in the waters does not fall below 50% saturation in any week during the year.

(c). Application to the conditions in Portland

With these preliminary observations as to the controlling criteria for selection of type of treatment for any given community, the Board is now prepared to consider the local conditions of the City of Portland, and to develop on the basis of those conditions quantitative findings which should lead to a decision as to most desirable type of treatment process for the local area. For this purpose, the Board has made the following assumptions, based upon previous studies by the municipality and its consultants, and upon adjustments considered wise by the present Board:

- (1). The population of Portland and environs will reach 450,000 in 1950.
- (2). The average sewage flow in 1950 will be 95.5 million gallons per day.
- (3). The sewage treatment plant should be designed for the 1950 population and average sewage flow.
- (4). The plant should be so designed as to provide for a reasonable amount of storm water flows in addition to sanitary sewage and industrial waste.
- (5). The characteristics of the sewage resulting from the Portland population would be represented by the following assumed values: a biochemical oxygen demand of 200 parts per million; suspended solids of 210 parts per million; and a B. coli content of 800,000 per cubic centimeter. (These assumptions rest upon comparable sewage analyses in many other communities "spot-checked" by laboratory tests of Portland sewage.)



(6). The Willamette River and the Columbia Slough are or will be used at or near Portland for the propagation and migration of fish, for bathing and recreation, for industrial water supplies, for the watering of livestock and for various private and public river and harbor improvements. Similar uses are assumed for the main Columbia River.

For the preservation of these bodies of water for fisheries purposes, it is assumed that the dissolved oxygen content of these waters should not at any time fall below 5 parts per million. This figure is intentionally placed at a high level, although some authorities in this field feel that a minimum dissolved oxygen content of 3 parts per million might suffice. The Board, however, considers the rivers of such importance in relation to fish life that it has assumed the figure of 5 parts per million for this purpose in its calculations.

In connection with the assumptions as to quantity of sewage flow and quality of sewage, insufficient studies have so far been made by the City of Portland to warrant completely final decisions as to these two important elements. It is reasonably safe, however, to use the figures which the Board has assumed for comparative purposes at this stage of the study. Their accuracy for final plant design should be determined at an early date and as herein later recommended.

The Board finds that the Willamette River reaches Sellwood Bridge in Portland with its dissolved oxygen content already seriously impaired, due to the discharge of important amounts of domestic and industrial waste on the Willamette and its tributaries above Portland. This critical situation in the River before it reaches Portland makes it important to call attention to the necessity of cleaning up the river above Portland at the same time as improvements in sewage treatment are undertaken by the City of Portland.

Until such cleaning of the upper river is accomplished, it is doubtful whether the Willamette River above Portland may be expected in the summer months to reach Portland with any more than 4 parts per million of dissolved oxygen. The Board does not retain its requirements of 5 p.p.m. residual oxygen for fish life in the Willamette River, because if it does so the calculations result in no available dilution waters during the low flow months.

It is, therefore, assumed that, of this 4 parts per million, 3 parts must be preserved for fish life. A residual of only 1 part per million is then available to assimilate and convert the treated or untreated sewage of the city. One part per million of residual oxygen in the river is the equivalent of 5,400 pounds of oxygen for each one thousand cubic feet per second of flow.

The Board has calculated the amount of dilution water required in the Willamette River to assimilate the sewage of the city with varying degrees of treatment. In this connection the Board has assumed that the combined sewage of the City of Portland represents an oxygen requirement for conversion of its organic constituents into stable inorganic material of 0.24 pound per person per day. In 1950, the population of 450,000 will therefore require 108,000 pounds of oxygen per day. This oxygen must be supplied either through the natural resources of the receiving bodies of water or through artificial treatment processes of varying degrees of efficiency.

The Board has assumed for purposes of calculation three commonly accepted degrees of treatment, viz: (a) no treatment except by dilution; (b) 33-1/30/0 of



removal of organic constituents; and (c) 90% removal of organic constituents. These degrees of treatment correspond in general to the following processes: No treatment, plain sedimentation, and activated sludge.

On the basis of these figures, the Board finds the results set forth in Table 1, showing the required diluting water in the Willamette River to provide for the safe disposal of the various effluents resulting from the three degrees of treatment. The quantitative evidence in Table 1 discloses at once that during a large part of the time the Willamette River is insufficient in flow to provide for adequate assimilation of the effluent from any of the treatment processes except the 90% one.

Table I

WILLAMETTE RIVER

Calculations of Oxygen Balance on Discharge of Portland Sewage  
with Various Degrees of Treatment

Degree of Treatment (On basis of bio- chemical oxygen demand)	Oxygen Required, pounds per day	Minimum Flow of River Re- quired to Satisfy Oxygen demand, cubic feet per Second	Percent of Time Requir- ed Flow is Available
None	108,000	20,000	52
33-1/3 o/o Treatment	72,300	13,400	62
90 o/o Treatment	10,800	2,000	100

COMPUTATIONS

1 cubic foot per second = 646,000 gallons per day

1 part per million of oxygen =  $0.646 \times 1000 \times 8.33 = 5380$ , say 5400 pounds  
per day per 1000 C.F.S.

Assumed sewage load (combined sewers) = 0.24 pound per capita per day @  
450,000 population = 108,000 pounds of oxygen  
required per day for untreated sewage.

Dissolved Oxygen, P.P.M.

Willamette River at Sellwood Bridge	4
Minimum requirement for fish life	<u>3</u>
Available	1

1 p.p.m. available is the equivalent of 5400 pounds per day per 1000 c.f.s.

If it is further assumed that 5 parts per million of dissolved oxygen is to be retained in the Willamette River, the conclusion is reinforced.

If sewage is to be discharged with safety into the Willamette River, it must be subjected to at least 90% treatment. It should be emphasized that this would still leave for discharge into the Willamette River 10% of the organic content of the original sewage requiring reasonable diluting amounts of water in the Willamette during every summer. This is particularly true since velocity and holding conditions in the Willamette at low flow are decidedly unsatisfactory. It is an unusually sluggish body of water with delayed carrying off of discharged materials. Although in later years the minimum flows in the Willamette will be increased by regulated flow controls, the conclusions here noted will not be affected in any important degree at that time.

Similar calculations have been developed for discharge into the Columbia River. The results are set forth in Table 2.



Table 2

COLUMBIA RIVER

Calculations of Oxygen Balance on Discharge of Portland Sewage  
with Various Degrees of Treatment

Degree of Treatment (On basis of bio- chemical oxygen demand)	Oxygen Required, pounds per day	Minimum Flow of River Re- quired to Satisfy Oxygen Demand, cubic feet per second		Percent of Time Requir- ed Flow is Available
		For 3ppm	For 5ppm	
None	108,000	4000	6700	100
33-1/3 o/o Treatment	72,300	2700	4500	100
90 o/o Treatment	10,800	400	670	100

COMPUTATIONS

SEE Table 1 for duplicate calculations

	Dissolved Oxygen, p.p.m.
Columbia River above Portland	8
Minimum Requirement for fish life	<u>3</u>
Available	5

5 p.p.m. is the equivalent of 27,000 pounds per day per 1000 c.f.s.

From 60 year record, minimum flow of Columbia River, unregulated,  
for a single day, in January, 1937, - 35,000 c.f.s.

Minimum flow with regulation will be - 80,000 c.f.s.

Reference to Table 2 indicates that Portland sewage in the amounts probably available in 1950 could be discharged into the Columbia River without any treatment whatever, with no deleterious effect in oxygen balance upon any of the present or potential uses of the Columbia River. This is the case not only upon the assumption that 3 parts per million of dissolved oxygen should be retained in the river for the preservation of fish and aquatic life, but also if it is assumed that 5 or 7 parts per million are so required. Our conferences with experts in the field of biological life, fisheries or otherwise, disclose that no experienced professional observer in this field suggests a residual oxygen of more than 5 parts per million. The Columbia River, therefore, can receive all of the Portland sewage untreated without detriment to its oxygen balance. It can do so because its mean monthly discharge has never fallen below 40,000 second feet in the period of record covering some sixty years.

It should be recalled and emphasized that the low flow on the Columbia occurs in midwinter, when the dilution necessities are at their lowest figure. In summer, when sewage assimilation proceeds at its greatest rate, the flow of the Columbia exceeds 100,000 c.f.s.

Within the next few years and no doubt before the Portland sewage treatment program has been consummated, the regulated flow of the Columbia River will result in a minimum flow of over 80,000 instead of 40,000 cubic feet per second. This future regulated flow would provide, without detriment to the river, for receiving the untreated sewage of approximately 1.5 million people.

In order to avoid, however, any conceivable evidence of sewage discharge into the Columbia River, the Board recommends that the sewage to be discharged into the Columbia River should be subject to plain sedimentation which will reduce the organic content of the sewage by at least  $33\frac{1}{3}\%$ .

It has been suggested by some that carrying sewage to the location here proposed would result in a quality of sewage difficult to treat. Our calculations show that the difference in time of transit of sewage to this location in contrast with any other proposed location is a matter of only hours. The time difference will not control the type or efficiency of treatment at any of the sites recommended.

Discharge into the Columbia Slough is not even desirable with 90% treatment, since its conditions of flow are decidedly inferior to those of the Willamette River.

In summary, therefore, the Board finds that if sewage is to be discharged into the Willamette River, it will require a minimum of 90% treatment; if it is to be discharged into the Columbia River a minimum of partial treatment will be required; and that preferably no sewage, no matter how well treated, should be discharged into the Columbia Slough.

On the basis of all considerations so far discussed, the Board recommends without qualification that the sewage of the City of Portland should be



collected and transported to the Columbia River, into which it should be discharged after treatment by plain sedimentation.

Discharge into the Oregon Slough (North Portland Harbor) is not recommended, since the flow in this area is only a fraction of that in the main Columbia River and since the discharge point is unnecessarily close to reasonably populated bathing beaches.

The plants on the Willamette River are not viewed with any great favor because of operating problems in connection with sludge handling, which experience elsewhere shows, makes the placement of such plants in heavily populated areas unwise, if alternative sites equally cheap are available in more isolated sections. These conclusions are later reinforced by considerations of costs for the various processes reviewed.

The science and art of sewage treatment are sufficiently well advanced in this country to make it unnecessary to construct and operate in Portland experimental or small pilot plants, prior to design and construction of full scale units. Although such a procedure has been suggested, the Board recommends against it.

Chlorination of the effluent is not considered necessary in any of the projects, although it will no doubt be used from time to time for special plant purposes.

#### MAIN COLLECTION SYSTEM FOR PORTLAND

The collection of sewage from the many outlets of the Portland sewerage system offers a more complicated and difficult set of problems than does the ultimate treatment of the collected material. This complex situation is brought about by the fact that practically all of the sewers in the City of Portland are of the combined type, namely, they are designed and constructed to carry storm water as well as sanitary sewage. Apparently none of them have been designed or constructed with reference to the ultimate problem of joining them at their outlets for the simplest and least expensive method of disposal of the sewage. As a result, a number of unsolved problems arise when a decision as to the best intercepting system is to be made. Existing data on normal and storm water flows are exceedingly meager. Estimates of cost at present available in the city engineer's office are equally preliminary in character and insufficient in extent or in exploration.

The preparation of an adequate plan for collection and the development of safe estimates of costs therefor will require many months and the expenditure of a reasonable amount of money. These facilities have not yet been accorded to the city engineer's office and, until they are, the exact method of design and construction and location of the main collection system cannot be definitely determined.

It still remains to be demonstrated, for example, whether all of the



sewage should be collected by low level interceptors, by high level interceptors, or by combinations thereof, which would carry the sewage by gravity and pumping to one or more of the assumed sites for treatment. Preliminary studies which the Board has undertaken since its arrival in Portland and similar studies by engineers concerned with the problem made prior to our arrival, give support to the hope that a combination of high level gravity and low level pumping interceptors will yield the greatest economy for the future. With these possibilities in mind, the Board has made comparative estimates of a number of projects for collecting the sewage and has compared undertakings on the low level interceptor basis with preliminary cost estimates for the combination of high level and low level methods.

In its evaluation of the main collection systems, the Board has reviewed a number of unit cost estimates. It believes that the figures are reasonably in accord with local costs for similar work, but it repeats its caution that the interceptor costs quoted in this document should be thoroughly checked by more detailed field and office studies. In its review of interceptor design and costs it has assumed that the intercepting sewers should be designed for a population of approximately 660,000 persons to be reached about the year 1970. It will be noted that this population is considerably in excess of the population of 450,000 assumed for the treatment plan design. This increase in population has been assumed in the design of the intercepting sewers because they are built deep in the ground, involve heavy and costly construction and cannot be readily enlarged or duplicated.

The relative costs of the various systems for intercepting sewers are shown in Table 3. The locations of these main collectors shown on the maps attached to this report are general and tentative in character, since adequate studies to determine their final and most economical location, for minimum construction as well as minimum permanent pumping costs, have not yet been made. The comparative costs will be discussed more fully below.

Table 3

## PORTLAND, OREGON

Estimated Cost of Constructing and Operating Interceptors, Pumping Stations  
and Treatment Plants. (As of August 19, 1939)

Project Number*	Cost of Interceptor System	Cost of Treatment Plant	Total Cost of System	Annual Cost			
				Operation	Pumping	Interest and Amortization at 5%	Total
1	7,728,000		7,728,000		104,600	386,400	491,000
1A	8,601,100		8,601,100		62,400	430,100	492,500
2	7,900,000	2,387,500	10,287,500	174,300	104,600	514,400	793,200
2A	8,773,100	2,387,500	11,160,600	174,300	62,400	558,000	794,700
3	7,900,000	5,730,000	13,630,000	630,000	104,600	681,500	1,416,100
3A	8,773,100	5,730,000	14,503,100	630,000	62,400	725,200	1,417,600
4	7,345,200		7,345,200		104,600	367,300	471,800
4A	8,218,300		8,218,300		104,600	410,900	515,500
5	7,517,200	2,387,500	9,904,700	174,300	104,600	495,200	774,100
5A	8,390,300	2,387,500	10,777,800	174,300	62,400	538,900	775,600
6	7,517,200	5,730,000	13,247,200	630,000	104,600	652,600	1,397,000
6A	8,390,300	5,730,000	14,120,300	630,000	62,400	706,000	1,398,400
7	7,088,100	5,061,500	12,149,600	536,800	87,100	607,300	1,231,400
7A	7,530,100	5,061,500	12,591,600	536,800	52,100	629,600	1,218,500
8	6,723,300	5,067,500	11,790,815	540,800	87,100	589,500	1,217,500
8A	6,769,100	5,067,500	11,836,600	540,800	54,000	591,800	1,186,600

Note: Projects marked "A" represent the system with high level interceptors taking part of the sewage to plant by gravity flow and low level interceptors for the portion to be pumped.

\* Project descriptions appear in text of Report on page 21



ESTIMATED COST OF CONSTRUCTING AND OPERATING SEWAGE TREAT-  
MENT PROCESSES FOR VARIOUS PROJECTS.

In the design of sewage treatment plants for Portland, similar difficulties have been encountered as in the design of the collecting system. Virtually no detailed engineering design for treatment plants is available at this stage in the city engineer's office. No reliable data have so far been collected on the flows or quality of sewage. No authentic detailed cost figures are at hand.

In this situation, as in others already discussed, we have been confronted, therefore, with the task of making assumptions in the design and in the cost figures as the result of our experience with undertakings of similar nature in a number of places throughout the country. We consider the cost estimates to be reasonably accurate and generally useful for comparative purposes. It cannot be too strongly emphasized, however, that they are entirely preliminary in nature and should not be accepted as final figures for construction, bond issue, or pay-as-you-go purposes. The estimates and the designs from which they emanate still remain to be prepared. They are not in existence today.

In general, the assumptions as to unit costs, construction and operation, result in the following averages:

Plant Cost

33-1/3% Treatment:

\$5.00 per capita - \$25,000 per million gallons

90 percent treatment:

\$12.00 per capita - \$60,000 per million gallons

Operation and Maintenance Charges

33-1/3 percent treatment:

\$5.00 per million gallons - \$0.40 per capita per year

90 percent treatment:

\$18.00 per million gallons - \$1.40 per capita per year (without sludge processing for fertilizer)

The Board has defined the various degrees of treatment upon which costs were determined as follows:



- (A) No treatment except by dilution - mechanical screening.
- (B) 33-1/3 percent treatment - mechanical screening, grit chambers, grease removal and plain sedimentation for two hours.
- (C) 90 percent treatment - mechanical screening, grease removal, preliminary settling for one hour, aeration for six hours, and secondary settling for two hours.

It has further assumed in each treatment program that the large amounts of sludge resulting from any of the processes will be handled as follows:

33-1/3 percent treatment - Digestion and vacuum filtration.  
 Digestion tanks - covered and heated, capacity 3 cubic feet per capita.

90 percent treatment - Digestion and vacuum filtration.  
 Digestion tanks - covered and heated, capacity 5 cubic feet per capita.

The final sludge cake in either process will be disposed of in land fill or carted away by farmers, at little or no revenue.

The Board has reviewed eight separate projects (shown schematically on attached charts) as follows:

- Project (1) The collection and discharge of sewage to the Columbia River without treatment.
- Project (2) The collection and discharge of sewage to the Columbia River with 33-1/3% treatment.
- Project (3) The collection and discharge of sewage to the Columbia River with 90% treatment.
- Project (4) The collection and discharge of sewage to the Oregon Slough (North Portland Harbor) without treatment.
- Project (5) The collection and discharge of sewage to the Oregon Slough with 33-1/3% treatment.
- Project (6) The collection and discharge of sewage to the Oregon Slough with 90% treatment.
- Project (7) The collection and discharge of sewage into the Willamette River with a single plant of 90% treatment.
- Project (8) The collection and discharge of sewage into the Willamette River with five plants of 90% treatment and one plant of 33-1/3% treatment with discharge into the Columbia River.

The costs of construction, operation and maintenance, and carrying charges are shown in detail in table 3.

#### RECOMMENDED LOCATION AND TYPE OF TREATMENT PLANT

The data already presented in Tables 1, 2 and 3 and hitherto discussed in some detail indicate without question that the most desirable plan for the collection and disposal of sewage for the City of Portland comprises carrying the sewage by a combination of high level and low level interceptors to a point beyond the Columbia Slough, where it would be subjected to partial treatment and then discharged by gravity through multiple outlets at a depth of not less than fifteen feet into the Columbia River. This plan will involve a construction cost of approximately \$10,000,000 and an annual fixed and operating cost of approximately \$794,000. This program is less costly than any of the other programs reviewed or submitted, which are capable of accomplishing the desired results. Further detailed studies as herein recommended will no doubt disclose that this project probably could be constructed at a cost in the neighborhood of \$10,000,000. It is cheaper in total annual cost by more than \$390,000 than any of the activated sludge proposals, since all of the 90% treatment plan programs involve heavy operating and fixed charges.

The plan (Project 2 or 2A herein recommended will produce a better condition in the Willamette River than any of the proposals for activated sludge treatment, since the latter must of necessity leave a 10% residual of organic materials for continuous discharge into the Willamette River. In other words, the most complete method of removing the sewage from the Willamette River is offered by the plan herein proposed. It is likewise the cheapest in first cost and in annual operation.

In reviewing these comparative costs, the reader must bear in mind that annual operating costs may have as much as or more significance than first cost. Hitherto, as far as the Board is aware, no previous report or discussion has concerned itself with the important element of operating costs. These cannot be indefinitely ignored.

The adoption of Project 2 or 2A will result in no detrimental effect on the Columbia River, possible of detection by any of our known physical, chemical or biological tests. It will remain for many decades a completely satisfactory method of providing for the local sewage situation. When the population of Portland and its environs has grown to over a million and a half, then the time for discussion of more complete treatment will be at hand. Until then, any other method of handling the situation merely calls for expenditures large in amount and completely unnecessary in character.

Before closing the discussion on sewage treatment processes and costs, the Board wishes to record the fact that it has reviewed proposals for treating the sewage of Portland in writing and in conversation with a variety of proponents of various plans. Without exception, not one of these proposals rests upon engineering data or cost figures of more than a highly preliminary kind. No proposal, even including those hitherto used by the city, rests upon any detailed or reasonably complete engineering or cost information. The city engineer's



office has been aware of this deficiency since April 7, 1935, when Mr. C. H. Smith recorded the lack of such studies and the necessity for providing time and money for making them. Funds have never been provided to the city engineer's office for such purposes. None of the previous consultants have been provided with sufficient data, therefore, to make final decisions.

We do not believe that this is the place to comment critically, beyond the above statements, upon some of the alternative schemes hitherto discussed by the public. Sufficient evidence is available, however, to show that in many of them the cost estimates are neither logical nor representative of the conditions which would be encountered in the Portland project.

One proposal submitted to the city, for example, calls for plants costing approximately \$2,720,000 for 320,000 people. Nowhere in the proposal does any estimate of operating costs appear. As a matter of fact, these operating costs for the plants proposed, notwithstanding that their capacity would be inadequate for the 450,000 population, would exceed \$30,000 a month. With sufficient plant capacity, these charges would exceed \$45,000 a month, taking no account of other discrepancies and omissions in the proposal.

#### RECOVERY AND SALE OF SEWAGE SLUDGE

The citizens of Portland have been led to believe that the sewage treatment costs would be met by an income to be derived from the sale of sewage sludge for fertilizer and from the sale of treated liquor for industrial water or irrigation purposes. It has even been stated that the cost of construction would likewise be amortized through such revenues.

Throughout the entire history of sewage treatment, this search for profitable use of the liquid and solids in municipal sewage has proceeded apace. Today the solution is almost as far away as it was fifty years ago.

It is true that the organic values and inorganic constituents of sewage materials have varying degrees of fertilizer value. The difficulty in realizing these values lies in the fact that it costs money both for plant structures and operation. The sludge from plain settling tanks, properly processed to avoid nuisance, has a reasonable fertilizer value. The sludge from activated sludge treatment plants, likewise adequately processed, has a greater fertilizer value. Both of these materials are being used for fertilizer purposes throughout the United States, but nowhere at a net profit to the community. There are one or two minor instances, under very unusual local circumstances, where such operations have resulted in no loss. The number of these latter is insignificant and their application to Portland is unwarranted.

In the two or three important plants in the United States in which activated sludge has been recovered on a commercial scale, at no time has the income from the sales of fertilizer resulted in a net profit or a breaking-even in operating costs. Nowhere have such incomes reached the level of assisting in amortizing the cost of the plant.

If the Milwaukee, Wisconsin, experience, for example, in this field were applied to Portland, with a present population of 320,000 persons, the loss upon sludge conditioning and processing alone would exceed \$125,000 per year.



The availability of mineral phosphates in the Pacific Northwest and the necessity for increased fertilizer use in the same region, may some day warrant the City of Portland's entrance into the commercial fertilizer field, under the guise of sewage treatment. When that time arrives, the recommended plan of treatment can be extended without loss of structure or investment to provide for sludge processing. The treatment proposed on the Columbia River can always be extended to provide for more treatment, such as activated sludge or for sludge processing. When firm contracts for such fertilizer are at hand, reasonably guaranteed by reliable companies, the city may profitably re-open the discussion.

Until that time, the City of Portland would be warranted in undertaking the production of fertilizer only because it has determined to do so as an independent commercial enterprise and not because it is compelled to do so or finds it profitable to do so as an integral part of the correction of its stream pollution conditions.

#### METHODS OF FINANCING PROPOSED PROJECT

It is the understanding of the Board of Review that up to the present moment the plan of meeting the costs of construction and ultimate operation of the sewage collection and treatment program was on a "pay-as-you-go" basis. This program provided originally for sewer service charges which were expected to yield an estimated yearly revenue of between \$400,000 and \$500,000. The Sewer Charge Equalization Board has recently indicated, however, that its proposals will produce a gross annual revenue of only approximately \$275,000.

It should be clear that with the original estimated revenue of \$400,000 annually, a construction program of approximately \$10,000,000 would take 25 years to complete, provided, of course, no federal subsidies or grants were included or supplied in the interval. With the present anticipated revenue of \$275,000 a year, the \$10,000,000 construction program will stretch over a period of over 35 years. Even if federal grants to the extent hitherto provided are assumed, the program will not be completed in less than 20 years.

The Board considers a construction program of this character and of the amount herein recommended as wholly impractical of accomplishment by the pay-as-you-go procedure, at least with the current anticipated revenues.

Although it is true that certain portions of the program might be undertaken and finished independently of others, particularly in the case of the Columbia Slough portion, even these would require five or six years for unit completion. In the meantime, the Willamette River would not be materially improved. As a matter of fact, until the Willamette River intercepting system is completed, the objectionable conditions of that river will remain approximately the same.

It does not appear to the Board that the program as herein recommended can be adequately accomplished to the advantage of the public on a strictly pay-as-you-go piece-meal basis.



It is likewise doubtful whether a rigid pay-as-you-go principle is sound for the entire construction costs, particularly in view of the fact that both the collection system and the treatment plant are designed for populations to be reached from 15 to 35 years from now. There is no real basis in equity for the present user to bear the full construction load for the ultimate user. Even assuming that current annual revenues were much larger than the anticipated ones, it is our judgment that the equities of the financial scheme would be even more seriously disturbed.

It is our belief that a sounder principle of financing would rest upon a bond issue for the greater part of construction and sewer service charges for operation and maintenance.

The fixed charges on the bond issue, aggregating in our estimate approximately \$550,000, should more properly rest at least in part upon the assessed valuation.

Any combination in modification of this proposal might be used. For example, the Columbia Slough undertaking might be carried out by a bond issue, to be followed by additional construction from year to year out of accumulated annual sewer service charge revenues. The procedure, however, would be long and time consuming.

The more reasonable proposal would be to finance the entire intercepting sewer undertaking through a bond issue of approximately \$7,500,000. By the time it is studied, designed and constructed, sufficient money will have accumulated from the sewer service charges to undertake an important portion of the necessary sewage treatment plant. By this process the entire program could be completed no later than 1948. It rests, however, upon a bond issue of the general obligation type, upon sewer service charges for operation and maintenance and upon an increased tax rate for the fixed charges on the construction bond issue. The method is intended to facilitate cleaning up the Willamette River and the Columbia Slough. By any other method this desired result would be postponed a quarter of a century. The citizens of Portland and the Mayor and Council must, of course, decide upon the alternative choice.

#### RECOMMENDED IMMEDIATE STEPS

The City of Portland is not provided at this time with a sufficiently authoritative and detailed program of stream pollution correction to warrant the expenditure of funds on any important steps in the construction program. A number of months will be required to place it in such a position of preparedness. Because of this, the Board of Review makes the following suggestions:

1. The City should provide the personnel and equipment sufficient to carry forward investigations on the following important details:

- (a) The determination of flows in all the trunk sewers, with particular reference to minimum rates of flow and maximum rates.

(b) A detailed investigation of the present and ultimate population and industrial densities in each of the main interceptor areas.

(c) An evaluation of present and future population and industrial densities in outlying areas within and without the city limits.

(d) Field and laboratory investigation of the character and quantity of industrial and domestic wastes contiguous to the sewers.

(e) The study of the possibility and practicability of constructing sewers of the separate type in critical areas so as to reduce continuous and recurring pumping charges and to make greater use of high level gravity interceptors.

(f) The investigation of the detailed hydraulics of high level gravity and low level pumping interceptors.

(g) The investigation of the number, location and type of storm water diversion regulators and screens.

(h) The investigation of the existing sewerage system in order to prepare a schedule of replacements of portions of the system, obsolescent either because of physical condition or inadequate size.

(i) A comprehensive study of the engineering design and of the estimates of cost for a sewage treatment plant on the Columbia River.

(j) Adequate borings for interceptor tunnel locations, sites of pumping stations and treatment plant, and river crossings.

The personnel necessary for such an undertaking as outlined above will consist of approximately 40 men, of whom 20 should be individuals of highly specialized hydraulic and sanitary engineering experience. The principal or project engineer herein suggested should be a man of unusual and mature technical experience, equipped to assume complete charge of the investigations and designs, under the general direction of the city engineer. The following staff is suggested for consideration and discussion:

- 1 Principal or Project Engineer
- 3 Field Parties of 4 men each
- 13 Designers and Draftsmen
- 2 Computers of flow and population data
- 5 Subsurface survey men
- 3 Right-of-way men
- 2 Specification men
- 3 Clerks and typists
- 2 Designers - Treatment Plant
- 1 Chemist - Biologist
- 1 Assistant Chemist

Total 34



	Salaries	\$ 97,200
3 Consultants and Expenses		10,000
Equipment, materials, rent, transportation, etc.		22,800
Subsurface explorations, borings, etc.		<u>20,000</u>
Grand total		\$150,000

The work here outlined will take approximately a year and the costs will approach \$150,000.00.

The plan of action for this purpose and the operations thereunder should be currently reviewed and agreed upon by a Board of Consultants, of approximately three men, convened for this important purpose.

2. Following these investigations, the city engineer's office should be provided with sufficient funds to proceed at once with the preparation of detailed engineering plans and specifications, which could be used for advertisement for contract, if and when this latter step is taken. The additional amount of funds for this purpose would be in the neighborhood of \$25,000.

3. The Mayor and Council should request in the immediate future a formal ruling from the State Board of Health, the State Engineer, the State Sanitary Authority, the United States Army, the United States Bureau of Fisheries, and any other local, State or Federal agency having jurisdiction, as to their respective decisions upon the City of Portland's intention to discharge a sewage effluent from a sedimentation treatment plant into the Columbia River.

#### SUMMARY

The Board of Review records the following conclusions and recommendations:

1. The Willamette River during periods of low flow, normally during the summer months, is heavily polluted, unsafe for bathing, unsuitable for recreation purposes and impossible for sustained fish and aquatic life.

2. The City of Portland, through its various sewer outlets and the sewage resulting therefrom, is primarily responsible for this condition.

3. The Willamette River reaches the City Limits in none too good condition. It should undoubtedly be relieved of a large part of its domestic and industrial waste load, discharged into it before it reaches the City.

4. The Columbia Slough is in worse condition than the Willamette River.

5. The unsatisfactory conditions on the Willamette and the Columbia Slough can be eliminated almost entirely by collection and by treatment processes. It is recommended that the sewage discharge from all of the outlets on the Willamette River and the Columbia Slough from the City of Portland and its immediate environs be collected and transported to a site in the vicinity of Columbia Slough, there to be treated by sedimentation, and then discharged into the Columbia River through multiple outlets.

6. Such a plan of collection and treatment will eliminate the objectionable conditions already noted and will create no detectable deleterious effects on the Columbia River.

7. The cost of the main intercepting system will be approximately \$7,900,000.

8. The cost of the treatment plant will be approximately \$2,387,000.

9. The cost of pumping, of operation, and of fixed charges will be annually approximately \$794,000.

10. The program should be financed by a general obligation bond issue of approximately \$7,500,000, by a pay-as-you-go revenue from sewer service charges and by an increase in the general tax rate.

11. Approximately \$150,000 should be made available at once for detailed field and office surveys and for design for the proposed program.



## ACKNOWLEDGEMENTS

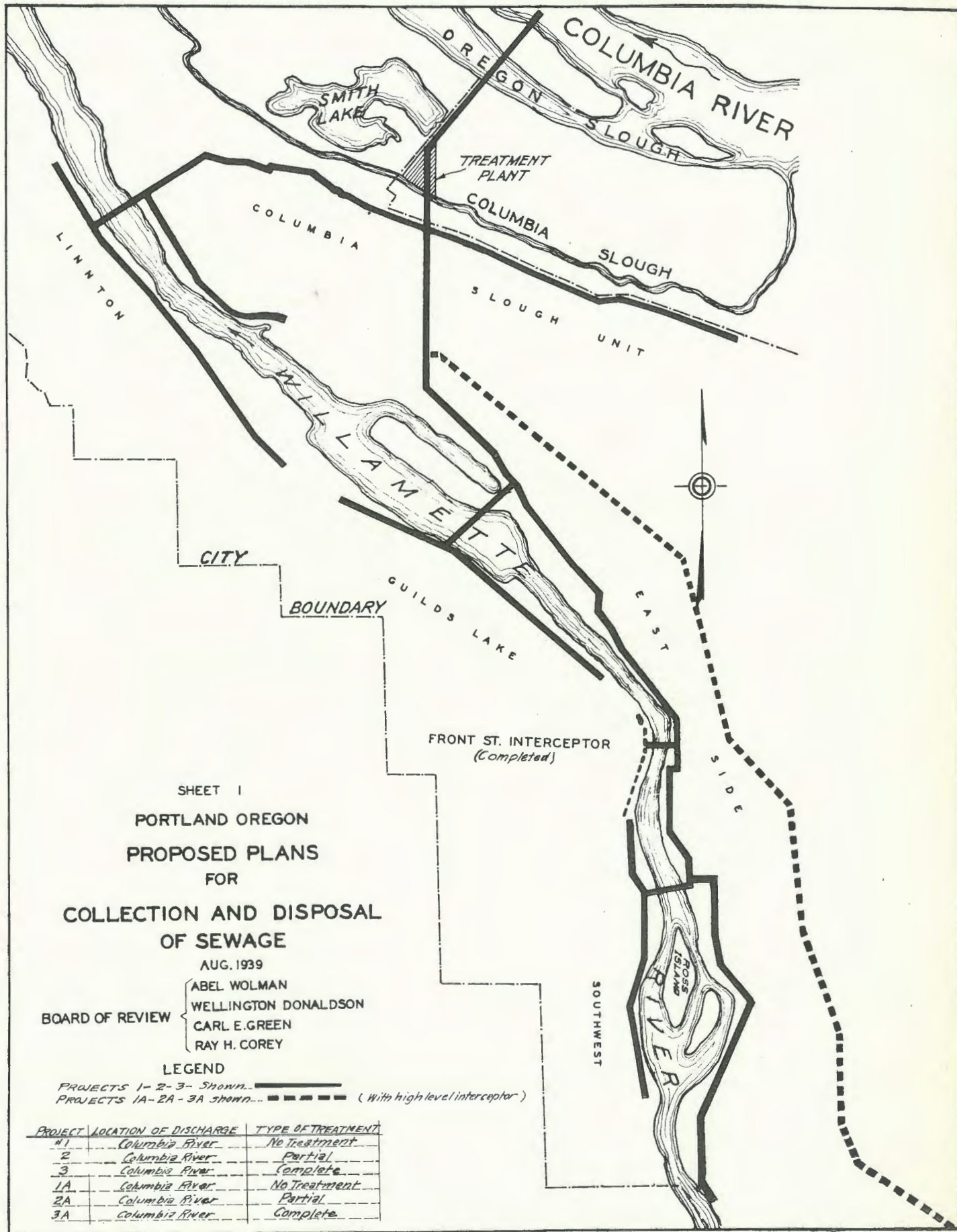
The Board of Review has had the complete and gracious cooperation of all the members of the municipal staff, upon whom it has called for information. It wishes to acknowledge at this point their whole hearted cooperation and support and intelligent participation in review and in revision of the many complicated features of the problem. Although it is impossible to enumerate the names of all who have thus cooperated, the Board does wish to make particular mention of the efforts of the following individuals:

Mayor Joseph K. Carson, Jr.  
Commissioner Wm. A. Bowes  
Commissioner R. E. Riley  
City Engineer Ben S. Morrow  
City Health Officer Adolph Weinzirl  
City Planning Commission  
City Park Department  
Dr. Frederick D. Stricker, State Health Officer  
Dr. D. B. Charlton  
Harlan B. Holmes

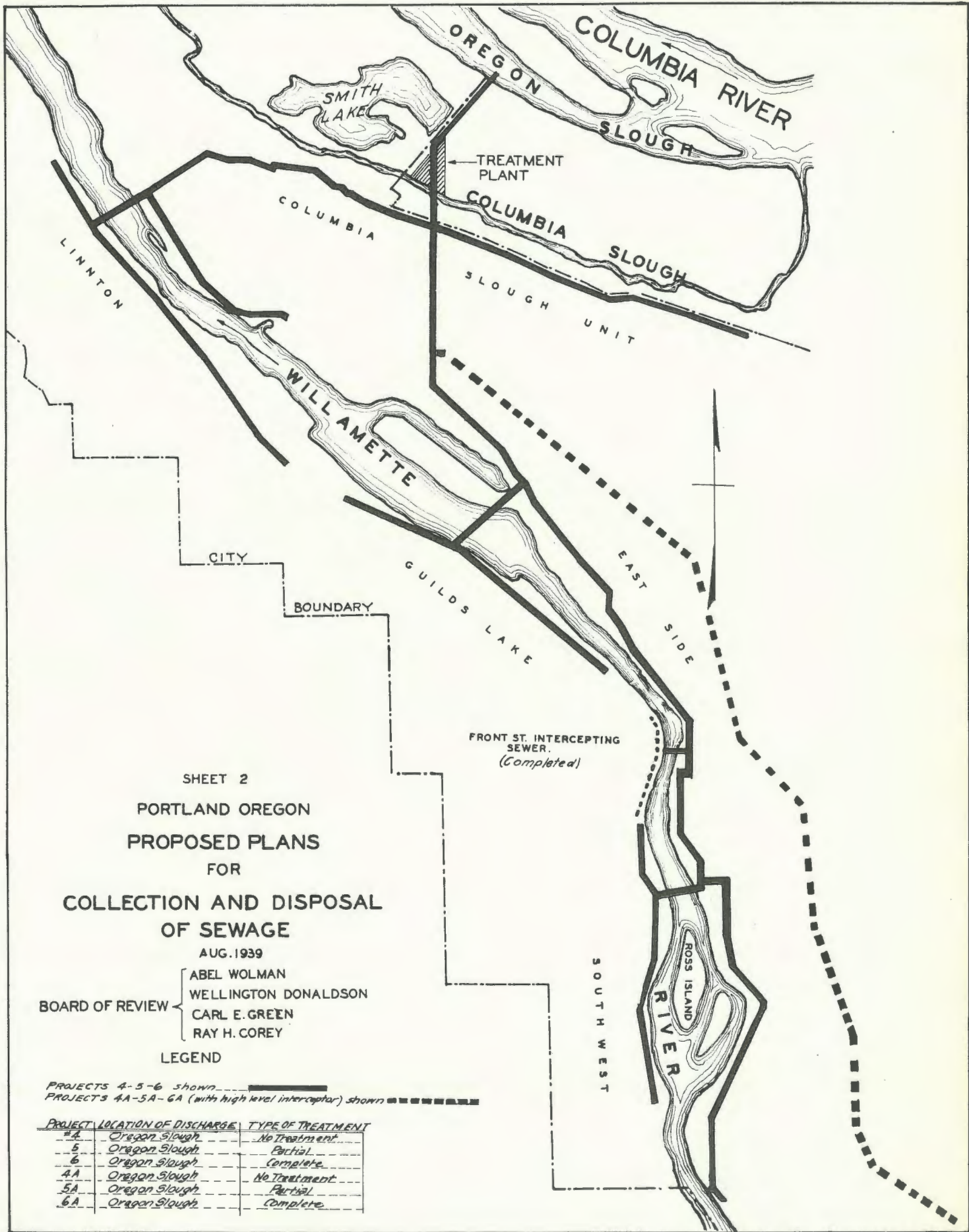
In addition, the Board has held a number of hearings at which complete cooperation has been afforded by a number of persons, who were interested in presenting points of view, programs of actions, and estimates of cost. It is particularly indebted to the following individuals and the groups they represent:

### Persons who appeared before the Board:

O. R. Bean  
R. E. Koon  
R. G. Dieck  
J. W. Cunningham  
John H. Lewis  
A. C. Forrester  
F. W. McQueen  
F. W. Allen  
W. W. Wolff )  
Arthur Day ) Federation of Community Clubs  
Paul Sayre )  
Dr. V. M. Wirtz )  
F. E. Coulter  
Mrs. Louise Palmer Webber  
Monroe Sweetland







SHEET 2  
 PORTLAND OREGON  
 PROPOSED PLANS  
 FOR  
 COLLECTION AND DISPOSAL  
 OF SEWAGE

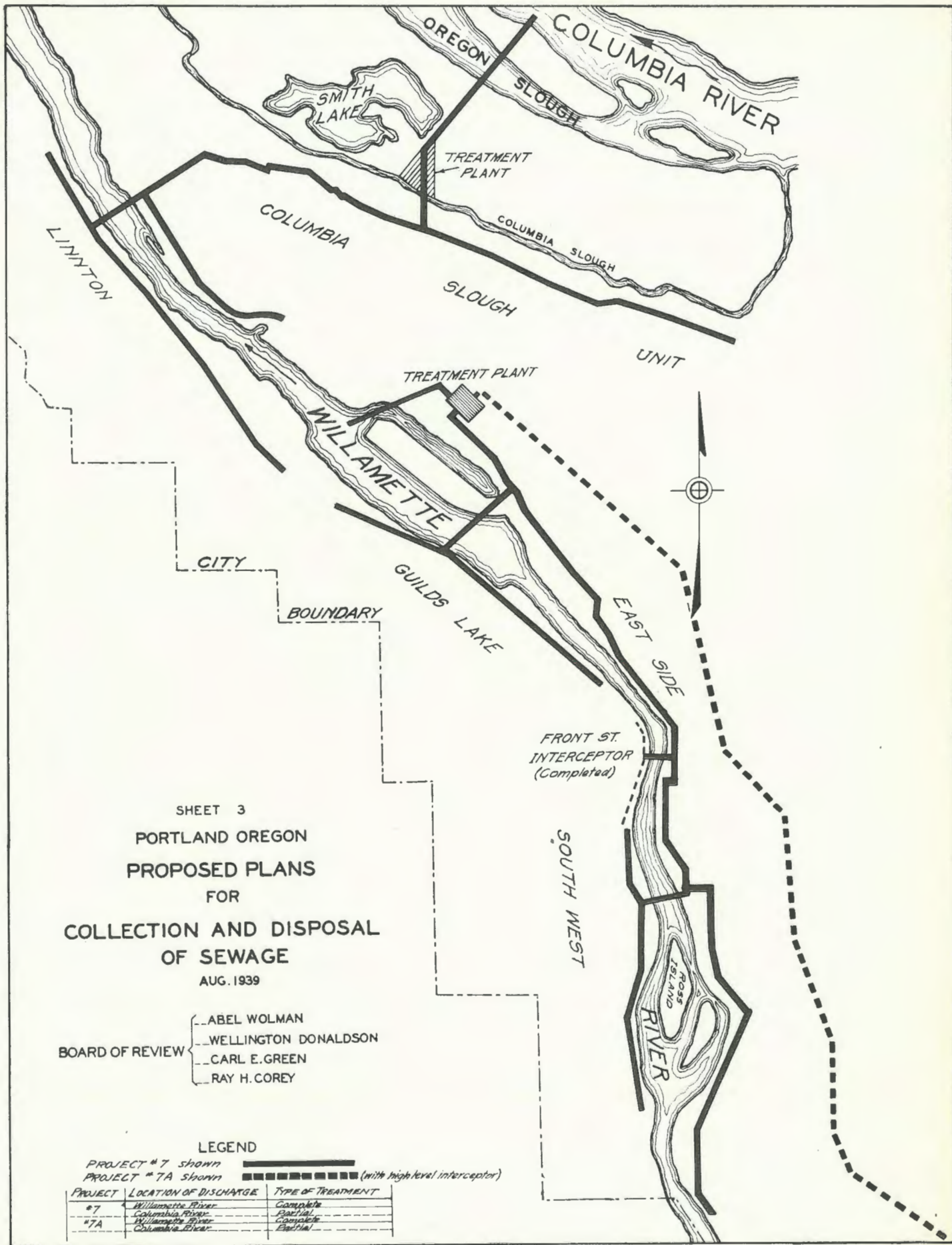
AUG. 1939

BOARD OF REVIEW {
   
 ABEL WOLMAN
   
 WELLINGTON DONALDSON
   
 CARL E. GREEN
   
 RAY H. COREY

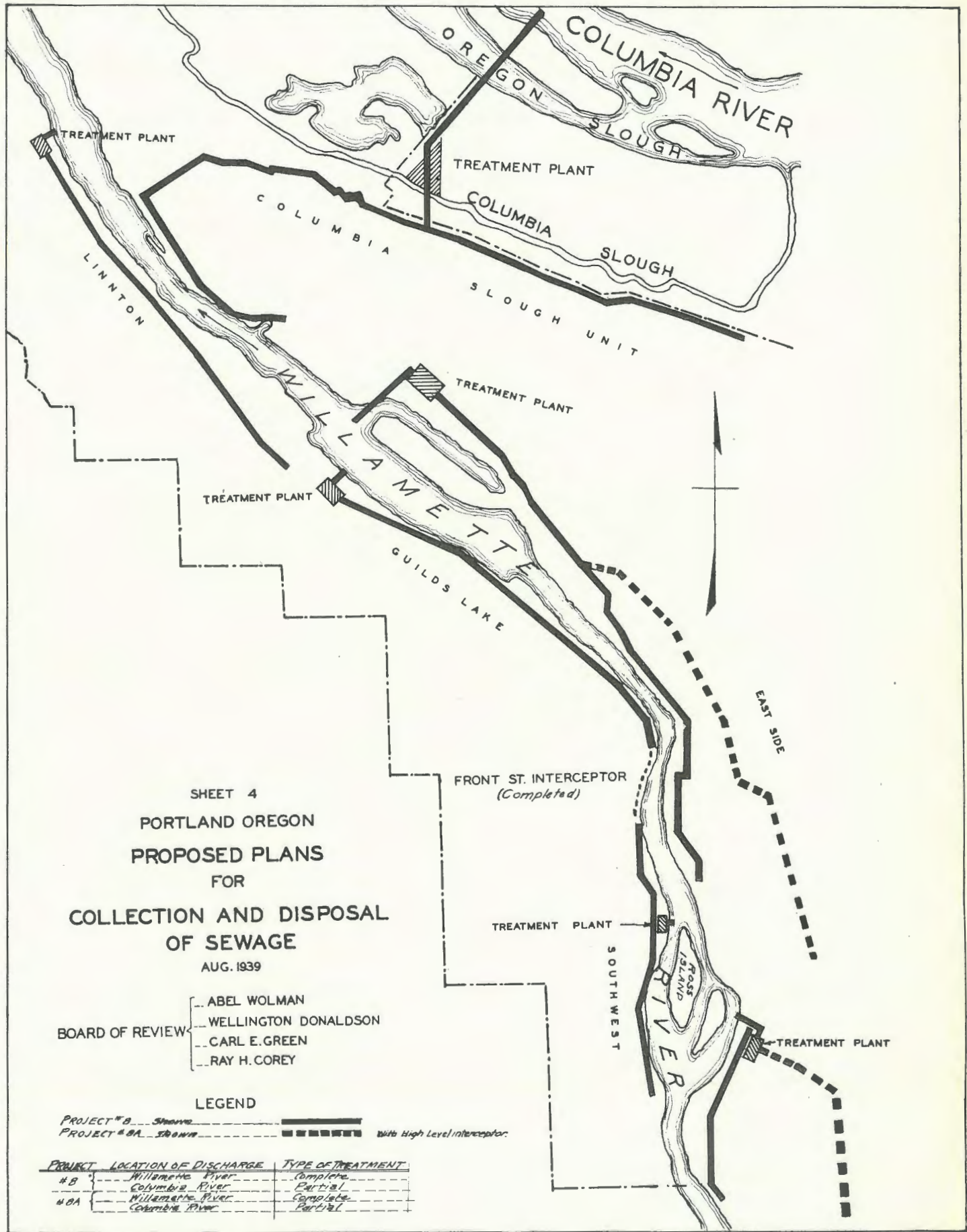
LEGEND

PROJECTS 4-5-6 shown 
  
 PROJECTS 4A-5A-6A (with high level interceptor) shown

PROJECT	LOCATION OF DISCHARGE	TYPE OF TREATMENT
4	Oregon Slough	No Treatment
5	Oregon Slough	Partial
6	Oregon Slough	Complete
4A	Oregon Slough	No Treatment
5A	Oregon Slough	Partial
6A	Oregon Slough	Complete









# Amendments to the Charter of the City of Portland and Resolution No. 21480

To Be Submitted to the Voters of Said City at the General Municipal Election To Be Held

TUESDAY, NOVEMBER 8, 1938

## RESOLUTION SUBMITTING QUESTION TO THE VOTERS:

RESOLUTION NO. 21480

BE IT RESOLVED BY THE COUNCIL of the City of Portland, Oregon, that there is hereby submitted to the legal voters of the City of Portland, Oregon, for their approval or disapproval at the general election to be held in said city on Tuesday, the 8th day of November, 1938, the question whether the City of Portland, Oregon, shall avail itself of the provisions of Chapters 441 and 442, Oregon Laws 1937, and the United States Housing Act of 1937, and take the necessary action for setting up a Housing Authority as a body corporate in this city, and each voter who votes thereon shall vote "Yes" or "No" in answer to the following question:

"Shall the Mayor and City Council of the City of Portland, Oregon, take the necessary steps to put into operation a Housing Authority in said city under the provisions and authority of Chapters 441 and 442, Oregon Laws 1937, and the United States Housing Act of 1937?"

Yes, I vote in favor of the establishment of such Housing Authority.

No, I vote against the establishment of such Housing Authority.

The ballot title for the foregoing question is as follows:

## RESOLUTION PROVIDING VOTERS SHALL ANSWER FOLLOWING QUESTION:

"Shall the Mayor and City Council of the City of Portland, Oregon, take the necessary steps to put into operation a Housing Authority in said city, under the provisions and authority of chapters 441 and 442, Oregon Laws 1937, and the United States Housing Act of 1937?"

500 Yes, I vote in favor of the establishment of such Housing Authority.

501 No, I vote against the establishment of such Housing Authority.

The Council of the City of Portland by Resolution No. 21480 adopted on the 6th day of July 1938, submitted the foregoing question to the legal voters of the City of Portland, Oregon, to be voted upon at the General Municipal Election to be held in said City on the 8th day of November, 1938, and the foregoing resolution and ballot title are published pursuant to the laws and ordinances in such cases made and provided.

Dated this 26th day of September, 1938.

Date of first publication September 27th, 1938.

Date of last publication September 28th, 1938.

EDWIN W. JONES,  
Auditor of the City of Portland.

## CHARTER AMENDMENT SUBMITTED TO THE VOTERS BY THE COUNCIL.

AN ACT  
To amend an Act of the Legislative Assembly of the State of Oregon entitled, "An Act to incorporate the City of Portland, Multnomah County, State of Oregon, and to provide a charter therefor and to repeal all acts or parts of acts in conflict therewith," filed in the office of the Secretary of State January 23, 1903, as subsequently amended by said Legislative Assembly, and by the people of the City of Portland from time to time, and as revised, codified and arranged by Ordinance No. 29350, passed August 19, 1914, amended June 6, 1928, by adding thereto a new section to be numbered section 347, giving the Council certain powers to prevent impurities and deleterious matter from entering the waters of the Willamette River, Columbia Slough, Columbia River or other waters in and adjacent to the City of Portland, from the City sewers and from certain other places, and authorizing the constructing, equipping and maintaining of a sewage disposal system or systems, and to fix and collect therefor sewer user service charges, subject to certain restrictions.

## BE IT ENACTED BY THE PEOPLE OF THE CITY OF PORTLAND, OREGON:

Section 1. The Act of the Legislative Assembly of the State of Oregon entitled, "An Act to incorporate the City of Portland, Multnomah County, State of Oregon, and to provide a charter therefor and to repeal all acts or parts of acts in conflict therewith," filed in the office of the Secretary of State January 23, 1903, as subsequently amended by said Legislative Assembly, and by the people of the City of Portland from time to time, and as revised, codified and arranged by Ordinance No. 29350, passed August 19, 1914, amended June 6, 1928, be and the same hereby is amended by adding thereto a new section to be numbered section 347, which section shall read as follows:

## Section 347. DECLARATION OF PURPOSE, GRANT OF POWER: SEWAGE DISPOSAL OR SEWAGE PURIFICATION SYSTEM AUTHORIZED:

For the purpose of preventing, reducing and correcting the pollution of the waters of the Willamette River, the Columbia Slough, the Columbia River, and other waters in and adjacent to the City of Portland, the Council is granted power and authority:

1. To construct, equip, operate and maintain a sewage disposal or sewage purification system within and/or without the corporate limits, including intercepting sewer mains, diversions, pumping or ejector stations, treatment and/or disposal plant or plants with appurtenances for the treatment and/or disposal of sewage, and so designed that it will be possible to extend and amplify to any degree of treatment without unnecessary financial loss in revisions and additions.
2. To dispose of by-products of sewage reduction, purification or treatment, and the effluent from sewage disposal plants, either by sale of by-products, chlorination and removal of effluent, or in such other manner as the Council may from time to time determine.
3. To acquire by grant, purchase and/or condemnation, lands, rights of way, easements or privileges therefor, either within or without the corporate limits.
4. To construct a sewage disposal, sewage purification or sewage treatment system in units leading to an ultimate system.
5. To determine the class or kind of materials to be used in construction of a sewage disposal, sewage purification or sewage treatment system, including the intercepting sewers and all appurtenant devices and structures.
6. To require from the City Engineer plans and specifications and esti-

from funds accruing from a sewer user service charge or the sale of salvaged products, or both, or from funds acquired from grants from any Federal or other agency, or both.

11. To determine, fix and collect a sewer user service charge when and if necessary.

12. To provide the mode and manner of collecting the sewer user service charge, and if such sewer user service charges so established be not paid when due to provide for penalties, interest and cost.

13. To create a Board of Equalization and define its powers and authority, which Board shall be established for the purpose of adjusting the sewer user service charges.

14. To provide as authorized by Chapter 289 Oregon Laws 1933, that if the sewer user service charges established by the Council be not paid when due the amount or amounts thereof, together with such penalties and interest and cost as may be provided by ordinance, may be recovered in an action at law; or, may be certified to the assessor of Multnomah County, and be by him assessed against the premises serviced and shall thereupon be collected and paid over in the same manner as other taxes are certified, assessed, collected and paid over.

15. To determine the time the sewer user service charge shall continue or cease for the purpose of providing funds with which to construct, equip, operate and maintain a sewage disposal, sewage purification or sewage treatment system.

16. To provide that the funds collected from the sewer user service charges shall be placed in a separate fund designated "Sewage Disposal Fund," disbursements therefrom to be made on warrants signed by the Auditor and Commissioner of Public Works, and to provide that all net profits from the sale of salvaged products shall be conveyed into the same fund, reducing to such extent any levy made as user charge.

17. To receive and accept grants and/or loans from the Federal Government and/or its agencies for planning and carrying out the construction and installation of such sewage disposal.

18. It is ordained that the amount of the sewer user service charge shall not exceed 33 1/3 per cent of the current water charge as annually fixed by the Council for the Bureau of Water Works, except that the sewer user service charge for a dwelling during the months of June, July, August and September in any year shall be based upon not to exceed 33 1/3 per cent of the monthly average of the water charged for the previous four months or if there has not been four months' water charge prior to June, then not to exceed 33 1/3 per cent of the average water charge of the previous months less than the said four months shall be the basis of the sewer user service charge. Where there has been no water charge for one month prior to June in any year, the sewer user service charge shall be not to exceed 33 1/3 per cent of the minimum water charge for that particular residence. All sewer user service charges shall be collected by the Bureau of Water Works coincident with its collection of water charges.

19. It is ordained that for industries, industrial plants, utilities and other business or enterprises, where the use of water is such that a portion of the water delivered thereto does not flow into a city sewer or any sewer connecting with a city sewer, a sewer user service charge shall be made and paid upon the basis of water used or the sewer user service charge shall be computed on the basis of the flow of water metered at the place where the water enters the sewer. Where water from private wells is used and permitted to flow into a city serving sewer, a sewer user service charge shall be made and paid and based upon the flow of water metered at the place of discharge of the water.

20. It is ordained that where there is a sewer within one hundred (100) feet of any property put to a use which requires sewage facilities and not connected therewith, the sewer user service charge shall be assessed against such property the same as though connected.

21. It is ordained that the foregoing enumeration of particular powers granted to the Council by this section shall not be construed to impair any general grant of power elsewhere contained in this charter, nor to limit any such general grant of power of the same class or classes as those so enumerated.

22. It is ordained that as an aid to the purification of the waters of the Willamette River, the Council is granted power and authority to enact legislation prohibiting industries, industrial plants or utilities or other enterprises, ships, vessels, or other river craft from placing or draining deleterious matter into the waters of the Willamette River within the confines of the City, and to require all such to connect their properties with the sewage disposal system when physically possible; if physically impossible, then to compel all such to construct a sewage or waste disposal system as may be prescribed and required by ordinance.

23. Nothing herein contained shall be construed to repeal, modify or abrogate the power of the Council under the charter, or charter-ordinances, relating to the construction of sewers, the cost of which is paid by special assessment upon properties benefited thereby, nor prohibit in such cases, property owners bonding the cost of said sewers and the issuance of bonds by the City incident thereto, nor to repeal, modify or abrogate any power and authority now vested in the Council to issue bonds or other evidences of indebtedness for the purpose of constructing, equipping, or maintaining sewage disposal systems.

24. It is ordained in order that funds may be secured to carry out the purposes of this act, the Council is granted the power and authority to establish and put into effect and collect as of December 1st, 1938, a schedule of sewer user service charges and all persons or property using the present constructed sewage system of the city shall be required to pay the sewer user service charge notwithstanding the fact that the present serving sewers were constructed and paid for by such persons or property under the special assessment provisions of the charter or in case of sale of salvaged products, the Council is granted authority to fix the terms and conditions for the sale of such salvaged products and to provide for the placing of the net profits therefrom in the special fund above mentioned.

25. It is ordained that in the event new sewers are constructed under the special assessment provisions of the charter, and connected with and served by a sewage disposal, sewage purification or sewage treatment system or unit thereof, a sewer user service charge, notwithstanding such special

loaned from the General Fund to the Sewage Disposal Fund exceed the sum of \$25,000.00.

29. It is ordained that in the event property is hereafter annexed to the corporate limits, the Council has power and authority to require sewers in such territory to be connected with the sewage disposal system, or a unit thereof, and to exact and collect a sewer user service charge.

30. It is ordained that all property adjacent to the City of Portland now or in the future deemed to be polluting the waters of the Willamette River, Columbia Slough or Columbia River shall be granted the right to use the sewage disposal facilities provided by the City of Portland upon such terms and under such conditions as may be determined by the Council; provided, however, that no such service shall be extended to property without the corporate limits of the City of Portland at a rate lower than that established for service to property within the said corporate limits.

The ballot title for the foregoing measure is as follows:

## CHARTER AMENDMENT SUBMITTED TO THE VOTERS BY THE COUNCIL. SEWAGE DISPOSAL ACT:

An Act amending the charter by adding thereto a new section numbered 347, providing it is the purpose of the people to establish, maintain and extend within and without the city limits a sanitary sewage disposal system to correct and prevent waterway pollution; authorizing engineering and technical service, providing for the assessment, collection and enforcement of service charge based upon water charge, creating Board of Equalization, authorizing allocation of revenue from disposal of by-products and residue to expense of system, creating Sewage Disposal Fund, authorizing acquisition of lands, rights of way, easements and other privileges, authorizing receipts of grants or loans from specified sources, continuing assessment authority for sewer construction and authorizing certain legislation to carry out the purposes of the Act.

502 Yes, I vote for the amendment.

503 No, I vote against the amendment.

The Council of the City of Portland by Resolution No. 21509 adopted on the 1st day of September, 1938, submitted the foregoing measure to the legal voters of the City of Portland, Oregon, to be voted upon at the General Municipal Election to be held in said City on the 8th day of November, 1938, and the foregoing measure and ballot title are published pursuant to the laws and ordinances in such cases made and provided.

Dated this 26th day of September, 1938.

Date of first publication September 27th, 1938.

Date of last publication September 28th, 1938.

EDWIN W. JONES,  
Auditor of the City of Portland.

## CHARTER AMENDMENT SUBMITTED TO THE VOTERS BY THE COUNCIL.

AN ACT  
To amend an Act of the Legislative Assembly of the State of Oregon entitled, "An Act to incorporate the City of Portland, Multnomah County, State of Oregon, and to provide a charter therefor and to repeal all acts or parts of acts in conflict therewith," filed in the office of the Secretary of State January 23, 1903, and as subsequently amended by the people of the City of Portland from time to time and as revised, codified and arranged by Ordinance No. 29350, passed August 19, 1914, amended June 6, 1928, by adding thereto a new section to be numbered section 190-1b, and declaring that it is the intent of the people, during the next ensuing 10-year period to establish a system of public recreational areas by acquiring land for parks, playgrounds and playfields and improving and equipping the same, and providing that the land may be purchased from private owners or it may be acquired through the exchange of publicly owned property for private property as authorized by Chapter 138, Oregon Laws 1935, and directing the Council to levy, for a period of ten years, a special tax of four-tenths of one mill and directing the proceeds thereof to be kept in the public recreational areas fund and to be used for said recreational purpose as provided in the act.

## BE IT ENACTED BY THE PEOPLE OF THE CITY OF PORTLAND, OREGON:

Section 1. That an Act of the Legislative Assembly of the State of Oregon entitled, "An Act to incorporate the City of Portland, Multnomah County, State of Oregon, and to provide a charter therefor and to repeal all acts or parts of acts in conflict therewith," filed in the office of the Secretary of State January 23, 1903, and as subsequently amended by the Legislature and by the people of the City of Portland from time to time and as revised, codified and arranged by Ordinance No. 29350, passed August 19, 1914, amended June 6, 1928, be and the same is hereby amended by adding thereto or inserting therein a new section to be numbered 190-1b, which new section shall read as follows:

## Section 190-1b. DECLARATION OF PURPOSES: PUBLIC RECREATIONAL AREAS TO BE ACQUIRED, IMPROVED AND EQUIPPED:

It, hereby, is declared that it is the purpose of the people that during the ensuing period of ten years there shall be established, in the City of Portland, a system of public recreational areas consisting of neighborhood parks, playgrounds, and playfields and the acquiring, improving and equipping thereof in the localities within the City boundaries where in the judgment of the City Council they are most needed to meet the requirements of the people.

The Council, hereby, is granted authority to acquire land therefor, and to improve and equip the same. The land required for the purpose of carrying out the intent of this act may be acquired, by the Council, either by purchase from private owners or by exchanging with private owners any of the real property now, or hereafter, owned by the City and not needed for public use, as authorized by Chapter 138, Oregon Laws 1935, and the exchange of properties shall be made in conformity with said law. The Council may enact any further or additional legislation required to carry out the purposes of this act.

The Council, hereby, is authorized

act shall not be computed as a part of the revenues raised by taxation which is subject to the tax limitation of the Constitution, or the charter, and the said tax herein provided for shall be in addition to all other taxes which may be levied according to law.

The Council, hereby, is granted authority to fix the order of the establishment of said recreational projects and to determine the number of projects of the public recreational system that shall be acquired, improved or equipped in any one year of said 10-year period.

The Council, hereby, is authorized to accept from any Federal agency a grant of funds which may be used either in the purchase of land, for the payment of the cost of the improving, equipping or the maintaining of any of the projects of the public recreational system provided for herein.

The ballot title for the foregoing measure is as follows:

## CHARTER AMENDMENT SUBMITTED TO THE VOTERS BY THE COUNCIL. NEIGHBORHOOD PARKS, PLAYGROUNDS AND PLAYFIELDS ACT.

An Act to amend the charter by adding thereto a new section numbered section 190-1b, providing it is the purpose of the people to authorize the Council during the ensuing ten years to establish neighborhood parks, playgrounds and playfields in the City by purchasing and exchanging real property, and equipping the same, and during said period levying a special tax each year of four-tenths of one mill for said purposes.

504 Yes, I vote for the amendment.

505 No, I vote against the amendment.

The Council of the City of Portland by Resolution No. 21512 adopted on the 7th day of September, 1938, submitted the foregoing measure to the legal voters of the City of Portland, Oregon, to be voted upon at the General Municipal Election to be held in said City on the 8th day of November, 1938, and the foregoing measure and ballot title are published pursuant to the laws and ordinances in such cases made and provided.

Dated this 26th day of September, 1938.

Date of first publication September 27th, 1938.

Date of last publication September 28th, 1938.

EDWIN W. JONES,  
Auditor of the City of Portland.

## CHARTER AMENDMENT SUBMITTED TO THE VOTERS BY THE COUNCIL.

AN ACT  
To amend an Act of the Legislative Assembly of the State of Oregon entitled, "An Act to incorporate the City of Portland, Multnomah County, State of Oregon, and to provide a charter therefor and to repeal all acts or parts of acts in conflict therewith," filed in the office of the Secretary of State January 23, 1903, as subsequently amended by said Legislative Assembly, and by the people of the City of Portland from time to time, and as revised, codified and arranged by Ordinance No. 29350, passed August 19, 1914, amended June 6, 1928, by amending Section 102 thereof to allow the Civil Service Board to set up additional qualifications not now set forth in the charter which shall be met by applicants as a condition to taking civil service examinations, and establish age limit for appointment to the Bureau of Fire.

## BE IT ENACTED BY THE PEOPLE OF THE CITY OF PORTLAND, OREGON:

Section 1. That an Act of the Legislative Assembly of the State of Oregon entitled, "An Act to incorporate the City of Portland, Multnomah County, State of Oregon, and to provide a charter therefor and to repeal all acts or parts of acts in conflict therewith," filed in the office of the Secretary of State January 23, 1903, as subsequently amended by said Legislative Assembly and by the people of the City of Portland from time to time, and as revised, codified and arranged by Ordinance No. 29350, passed August 19, 1914, amended June 6, 1928, be amended by amending Section 102 to read as follows:

## Section 102. EXAMINATIONS—ENTRANCE AGE OF MEMBERS OF THE BUREAU OF POLICE AND FIRE.

The Board shall, from time to time, hold public competitive examinations to ascertain the fitness of applicants for all offices, places and employments in the classified civil service. Said entrance examinations shall be confined to citizens of the United States who can read and write the English language and shall be open to all such citizens who possess such qualifications as may, by rule, be prescribed by the Board. Notice of the time, place and general scope of every examination shall be given by the Board by publication in the City Official Newspaper once each week for two successive weeks and by posting such notice in a conspicuous place in the office of the Board not less than two weeks preceding the examination. Such examinations shall be practical in their character, and shall relate only to those matters which may fairly test the relative fitness of the persons examined to discharge the duties of the positions for which they are applicants and shall include, when appropriate, tests of health and physical qualifications and of manual, clerical or professional skill. No question in any examination shall relate to political or religious opinions, affiliations or services. The Board shall control all examinations and shall designate the persons who shall act as examiners at any examination. When a person in the official service of the City is designated by the Board, he shall, without being entitled to extra compensation therefor, act as such examiner. Any Commissioner may act as an examiner. All patrolmen shall be between the ages of twenty-one (21) and thirty (30) years on the date of their appointment. All hosemen shall be between the ages of twenty-one (21) and twenty-six (26) years on the date of their appointment.

The ballot title for the foregoing measure is as follows:

## CHARTER AMENDMENT SUBMITTED TO THE VOTERS BY THE COUNCIL. CIVIL SERVICE QUALIFICATIONS ACT.

An Act amending the charter by amending Section 102, providing it is the purpose of the people to remove limitations and allow Civil Service Board to set up additional qualifications as a condition to taking civil



Dated this 26th day of September, 1938.  
Date of first publication September 27th, 1938.  
Date of last publication September 28th, 1938.

EDWIN W. JONES,  
Auditor of the City of Portland.

### CHARTER AMENDMENT SUBMITTED TO THE VOTERS BY THE COUNCIL.

#### AN ACT

To amend an Act of the Legislative Assembly of the State of Oregon entitled, "An Act to incorporate the City of Portland, Multnomah County, State of Oregon, and to provide a charter therefor and to repeal all acts or parts of acts in conflict therewith," filed in the office of the Secretary of State January 23, 1903, as subsequently amended by said Legislative Assembly, and by the people of the City of Portland from time to time, and as revised, codified and arranged by Ordinance No. 29350, passed August 19, 1914, amended June 6, 1928, by adding thereto a new section to be numbered section 347, giving the Council certain powers to prevent impurities and deleterious matter from entering the waters of the Willamette River, Columbia Slough, Columbia River or other waters in and adjacent to the City of Portland, from the City sewers and from certain other places, and authorizing the constructing, equipping and maintaining of a sewage disposal system or systems, and to fix and collect therefor sewer user service charges, subject to certain restrictions.

### BE IT ENACTED BY THE PEOPLE OF THE CITY OF PORTLAND, OREGON:

Section 1. The Act of the Legislative Assembly of the State of Oregon entitled, "An Act to incorporate the City of Portland, Multnomah County, State of Oregon, and to provide a charter therefor and to repeal all acts or parts of acts in conflict therewith," filed in the office of the Secretary of State January 23, 1903, as subsequently amended by said Legislative Assembly, and by the people of the City of Portland from time to time, and as revised, codified and arranged by Ordinance No. 29350, passed August 19, 1914, amended June 6, 1928, be and the same hereby is amended by adding thereto a new section to be numbered section 347, which section shall read as follows:

#### Section 347. DECLARATION OF PURPOSE: GRANT OF POWER: SEWAGE DISPOSAL OR SEWAGE PURIFICATION SYSTEM AUTHORIZED:

For the purpose of preventing, reducing and correcting the pollution of the waters of the Willamette River, the Columbia Slough, the Columbia River, and other waters in and adjacent to the City of Portland, the Council is granted power and authority:

1. To construct, equip, operate and maintain a sewage disposal or sewage purification system within and/or without the corporate limits, including intercepting sewer mains, diversions, pumping or ejector stations, treatment and/or disposal plant or plants with appurtenances for the treatment and/or disposal of sewage, and so designed that it will be possible to extend and amplify to any degree of treatment without unnecessary financial loss in revisions and additions.

2. To dispose of by-products of sewage reduction, purification or treatment, and the effluent from sewage disposal plants, either by sale of by-products, chlorination and removal of effluent, or in such other manner as the Council may from time to time determine.

3. To acquire by grant, purchase and/or condemnation, lands, rights of way, easements or privileges therefor, either within or without the corporate limits.

4. To construct a sewage disposal, sewage purification or sewage treatment system in units leading to an ultimate system.

5. To determine the class or kind of materials to be used in construction of a sewage disposal, sewage purification or sewage treatment system, including the intercepting sewers and all appurtenant devices and structures.

6. To require from the City Engineer plans and specifications and estimates of costs for a sewage disposal, sewage purification or sewage treatment system showing the location of facilities, type of construction, type of equipment, cost estimates, division of units, duration of construction, program of construction, sewer user service charges; but the declaration of engineering and construction policies shall be tentative only and the final determination shall be at the discretion of the Council.

7. To enter into contracts for the construction of the units of a sewage disposal, sewage purification or sewage treatment system.

8. To employ and compensate technical, consulting or scientific engineering services in connection with a sewage disposal, sewage purification or sewage treatment system.

9. To enact such ordinance or ordinances from time to time as may be needed to give full effect to the grant of power conferred by this section.

10. To finance the cost of the construction, equipment and maintenance of a sewage disposal, sewage purification or sewage treatment system

September in any year shall be based upon not to exceed 33 1/3 per cent of the monthly average of the water charged for the previous four months, or if there has not been a four months' water charge prior to June, then not to exceed 33 1/3 per cent of the average water charge of the previous months less than the said four months shall be the basis of the sewer user service charge. Where there has been no water charge for one month prior to June in any year, the sewer user service charge shall be not to exceed 33 1/3 per cent of the minimum water charge for that particular residence. All sewer user service charges shall be collected by the Bureau of Water Works coincident with its collection of water charges.

19. It is ordained that for industries, industrial plants, utilities and other business or enterprises, where the use of water is such that a portion of the water delivered thereto does not flow into a city sewer or any sewer connecting with a city sewer, a sewer user service charge shall be made and paid upon the basis of water used or the sewer user service charge shall be computed on the basis of the flow of water metered at the place where the water enters the sewer. Where water from private wells is used and permitted to flow into a city serving sewer, a sewer user service charge shall be made and paid and based upon the flow of water metered at the place of discharge of the water.

20. It is ordained that where there is a sewer within one hundred (100) feet of any property put to a use which requires sewage facilities and not connected therewith, the sewer user service charge shall be assessed against such property the same as though connected.

21. It is ordained that the foregoing enumeration of particular powers granted to the Council by this section shall not be construed to impair any general grant of power elsewhere contained in this charter, nor to limit any such general grant of power of the same class or classes as those so enumerated.

22. It is ordained that as an aid to the purification of the waters of the Willamette River, the Council is granted power and authority to enact legislation prohibiting industries, industrial plants or utilities or other enterprises, ships, vessels, or other river craft from placing or draining deleterious matter into the waters of the Willamette River within the confines of the City, and to require all such to connect their properties with the sewage disposal system when physically possible; if physically impossible, then to compel all such to construct a sewage or waste disposal system as may be prescribed and required by ordinance.

23. Nothing herein contained shall be construed to repeal, modify or abrogate the power of the Council under the charter, or charter-ordinances, relating to the construction of sewers, the cost of which is paid by special assessment upon properties benefited thereby, nor prohibit in such cases, property owners bonding the cost of said sewers and the issuance of bonds by the City incident thereto, nor to repeal, modify or abrogate any power and authority now vested in the Council to issue bonds or other evidences of indebtedness for the purpose of constructing, equipping, or maintaining sewage disposal systems.

24. It is ordained in order that funds may be secured to carry out the purposes of this act, the Council is granted the power and authority to establish and put into effect and collect as of December 1st, 1938, a schedule of sewer user service charges and all persons or property using the present constructed sewage system of the city shall be required to pay the sewer user service charge notwithstanding the fact that the present serving sewers were constructed and paid for by such persons or property under the special assessment provisions of the charter or in case of sale of salvaged products, the Council is granted authority to fix the terms and conditions for the sale of such salvaged products and to provide for the placing of the net profits therefrom in the special fund above mentioned.

25. It is ordained that in the event new sewers are constructed under the special assessment provisions of the charter, and connected with and served by a sewage disposal, sewage purification or sewage treatment system or any unit thereof, a sewer user service charge, notwithstanding such special assessment, shall be paid, and so paid until such time as the sewer user service charge is discontinued.

26. It is ordained that the Bureau of Water Works shall be compensated for services rendered in collecting the sewer user service charges in such amount as shall be determined by the Council.

27. Costs of operation and maintenance of any unit of the sewage disposal system shall be paid from the sewage disposal fund.

28. It is ordained that at any time during the planning or construction of a sewage disposal, sewage purification or sewage treatment system if sufficient funds are not in the Sewage Disposal Fund, the Council is granted authority to borrow funds from the General Fund not in excess of \$25,000.00 for a period not exceeding one year, and the General Fund shall be reimbursed, with interest not exceeding six per cent, as funds are received by the Sewage Disposal Fund; provided, that at no time shall the amount herein authorized to be

Oregon, to be voted upon at the General Municipal Election to be held in said City on the 8th day of November, 1938, and the foregoing measure and ballot title are published pursuant to the laws and ordinances in such cases made and provided.

Dated this 26th day of September, 1938.

Date of first publication September 27th, 1938.

Date of last publication September 28th, 1938.

EDWIN W. JONES,  
Auditor of the City of Portland.

### CHARTER AMENDMENT SUBMITTED TO THE VOTERS BY THE COUNCIL.

#### AN ACT

To amend an Act of the Legislative Assembly of the State of Oregon entitled, "An Act to incorporate the City of Portland, Multnomah County, State of Oregon, and to provide a charter therefor and to repeal all acts or parts of acts in conflict therewith," filed in the office of the Secretary of State January 23, 1903, and as subsequently amended by the Legislature and by the people of the City of Portland from time to time and as revised, codified and arranged by Ordinance No. 29350, passed August 19, 1914, amended June 6, 1928, by adding thereto a new section to be numbered section 190-1b, and declaring that it is the intent of the people, during the next ensuing 10-year period to establish a system of public recreational areas by acquiring land for parks, playgrounds and playfields and improving and equipping the same, and providing that the land may be purchased from private owners or it may be acquired through the exchange of publicly owned property for private property as authorized by Chapter 138, Oregon Laws 1935, and directing the Council to levy, for a period of ten years, a special tax of four-tenths of one mill and directing the proceeds thereof to be kept in the public recreational areas fund and to be used for said recreational purpose as provided in the act.

### BE IT ENACTED BY THE PEOPLE OF THE CITY OF PORTLAND, OREGON:

Section 1. That an Act of the Legislative Assembly of the State of Oregon entitled, "An Act to incorporate the City of Portland, Multnomah County, State of Oregon, and to provide a charter therefor and to repeal all acts or parts of acts in conflict therewith," filed in the office of the Secretary of State January 23, 1903, and as subsequently amended by the Legislature and by the people of the City of Portland from time to time and as revised, codified and arranged by Ordinance No. 29350, passed August 19, 1914, amended June 6, 1928, be and the same hereby amended by adding thereto or inserting therein a new section to be numbered 190-1b, which new section shall read as follows:

#### Section 190-1b. DECLARATION OF PURPOSES: PUBLIC RECREATIONAL AREAS TO BE ACQUIRED, IMPROVED AND EQUIPPED:

It, hereby, is declared that it is the purpose of the people that during the ensuing period of ten years there shall be established, in the City of Portland, a system of public recreational areas consisting of neighborhood parks, playgrounds, and playfields and the acquiring, improving and equipping thereof in the localities within the City boundaries where in the judgment of the City Council they are most needed to meet the requirements of the people.

The Council, hereby, is granted authority to acquire land therefor, and to improve and equip the same. The land required for the purpose of carrying out the intent of this act may be acquired, by the Council, either by purchase from private owners or by exchanging with private owners any of the real property now, or hereafter, owned by the City and not needed for public use, as authorized by Chapter 138, Oregon Laws 1935, and the exchange of properties shall be made in conformity with said law. The Council may enact any further or additional legislation required to carry out the purposes of this act.

The Council, hereby, is authorized and directed, each year hereafter for a period of ten years, to levy a special tax of four-tenths of one mill on each dollar of valuation on all property in the City of Portland not exempt from taxation, the first levy to be made for the year 1939. The proceeds from such special tax levy shall be credited to a public recreational areas fund; provided, that when property now or hereafter owned by the City and not needed for public use, is hereafter used, or exchanged for private properties, to be used for said public recreational areas, such an amount of money required to pay the reasonable value of said land so owned, shall be taken from said public recreational areas fund and credited to the assessment collection fund established by section 284a of the charter.

The Council, hereby, is granted authority to lease land with an option to purchase same, if financially advantageous in carrying out the intent of this act. The special tax of four-tenths of one mill authorized by this

Date of last publication September 28th, 1938.  
EDWIN W. JONES,  
Auditor of the City of Portland.

### CHARTER AMENDMENT SUBMITTED TO THE VOTERS BY THE COUNCIL.

#### AN ACT

To amend an Act of the Legislative Assembly of the State of Oregon entitled, "An Act to incorporate the City of Portland, Multnomah County, State of Oregon, and to provide a charter therefor and to repeal all acts or parts of acts in conflict therewith," filed in the office of the Secretary of State January 23, 1903, as subsequently amended by said Legislative Assembly, and by the people of the City of Portland from time to time, and as revised, codified and arranged by Ordinance No. 29350, passed August 19, 1914, amended June 6, 1928, by amending Section 102 thereof to allow the Civil Service Board to set up additional qualifications not now set forth in the charter which shall be met by applicants as a condition to taking civil service examinations, and establish age limit for appointment to the Bureau of Fire.

### BE IT ENACTED BY THE PEOPLE OF THE CITY OF PORTLAND, OREGON:

Section 1. That an Act of the Legislative Assembly of the State of Oregon entitled, "An Act to incorporate the City of Portland, Multnomah County, State of Oregon, and to provide a charter therefor and to repeal all acts or parts of acts in conflict therewith," filed in the office of the Secretary of State January 23, 1903, as subsequently amended by said Legislative Assembly and by the people of the City of Portland from time to time, and as revised, codified and arranged by Ordinance No. 29350, passed August 19, 1914, amended June 6, 1928, be amended by amending Section 102 to read as follows:

#### Section 102. EXAMINATIONS—ENTRANCE AGE OF MEMBERS OF THE BUREAU OF POLICE AND FIRE.

The Board shall, from time to time, hold public competitive examinations to ascertain the fitness of applicants for all offices, places and employments in the classified civil service. Said entrance examinations shall be confined to citizens of the United States who can read and write the English language and shall be open to all such citizens who possess such qualifications as may, by rule, be prescribed by the Board. Notice of the time, place and general scope of every examination shall be given by the Board by publication in the City Official Newspaper once each week for two successive weeks and by posting such notice in a conspicuous place in the office of the Board not less than two weeks preceding the examination. Such examinations shall be practical in their character, and shall relate only to those matters which may fairly test the relative fitness of the persons examined to discharge the duties of the positions for which they are applicants and shall include, when appropriate, tests of health and physical qualifications and of manual, clerical or professional skill. No question in any examination shall relate to political or religious opinions, affiliations or services. The Board shall control all examinations and shall designate the persons who shall act as examiners at any examination. When a person in the official service of the City is designated by the Board, he shall, without being entitled to extra compensation therefor, act as such examiner. Any Commissioner may act as an examiner. All patrolmen shall be between the ages of twenty-one (21) and thirty (30) years on the date of their appointment. All hosemen shall be between the ages of twenty-one (21) and twenty-six (26) years on the date of their appointment.

The ballot title for the foregoing measure is as follows:

### CHARTER AMENDMENT SUBMITTED TO THE VOTERS BY THE COUNCIL. CIVIL SERVICE QUALIFICATIONS ACT.

An Act amending the charter by amending Section 102, providing it is the purpose of the people to remove limitations and allow Civil Service Board to set up additional qualifications as a condition to taking civil service examinations and establishing age limit for appointment to the Bureau of Fire.

Shall the charter be so amended?  
506 Yes, I vote for the amendment.  
507 No, I vote against the amendment.

The Council of the City of Portland by Resolution No. 21513 adopted on the 8th day of September, 1938, submitted the foregoing measure to the legal voters of the City of Portland, Oregon, to be voted upon at the General Municipal Election to be held in said City on the 8th day of November, 1938, and the foregoing measure and ballot title are published pursuant to the laws and ordinances in such cases made and provided.

Dated this 26th day of September, 1938.

Date of first publication September 27th, 1938.

Date of last publication September 28th, 1938.

EDWIN W. JONES,  
Auditor of the City of Portland.



Ordinance No. 71912

An Ordinance creating a Board of Equalization, providing recommendations therefrom to the Council for an equitable schedule of rates for sewer user service charges, providing its function and procedure.

The City of Portland does ordain as follows:

Section 1. CREATION OF BOARD OF EQUALIZATION. Pursuant to Section 347 of the city charter, as amended by the people on November 8, 1938, a Board of Equalization, to be known as the "Sewer Charge Equalization Board", is hereby created for the purpose of investigating, surveying and making a study of the use of City of Portland sewers and recommending to the Council an equitable schedule of rates for sewer user service charges in accordance with the provisions of said charter amendment and recommending amendments to said schedule of rates as may from time to time in its opinion be necessary, equitable and proper and for the purpose of applying, equalizing and adjusting sewer user service charges in accordance with a **schedule** of rates for sewer user service charges as may be established and from time to time amended by the Council.

Section 2. COMPOSITION AND COMPENSATION OF BOARD. Said Board shall be appointed by the Council and shall consist of three (3) members who shall be legal electors and householders of the City of Portland and who shall serve for a period of three (3) years, except that as designated by the Council, one of the first three members shall serve for one (1) year, and one for two (2) years. The member of said Board whose term shall first expire shall be chairman of said Board. Each member shall serve until his successor is appointed and qualified. In case of death or resignation of any member before the expiration of his term, a successor shall be appointed by the Council for the unexpired part of said term. In the absence of the chairman the members present shall choose a chairman pro tem. Each member of said Board shall be compensated at the rate of \$10.00 per day for actual services at meeting of said Board. No member of said Board shall sit upon or participate in any hearing or take part in recommending any rates in which he or she is personally or directly interested. At the time of appointing the members of the Board the Council shall appoint at least three (3) persons as alternates likewise qualified to serve in cases where regular members are disqualified or unable to serve.



Section 3. OATH. Each member of said Board shall subscribe an oath to any recommendations made to the Council that he or she is not personally or directly interested in the matters recommended and at the beginning of any hearing take oath that he or she is not personally or directly interested in the matter about to be heard and that he or she will hear all relevant facts admitted and make a prompt, just and fair determination to the best of his or her ability.

Section 4. DOMESTIC SEWER USERS NOT DISQUALIFIED. The fact that any member of the Board shall be a sewer user for household or domestic purposes shall not be a sufficient interest to be grounds of disqualification as provided in Section 2 hereof, nor shall it be a sufficient reason to prevent any such member from taking or subscribing the oath as provided in Section 3 hereof.

Section 5. SECRETARY TO BOARD. The City Auditor shall act as Secretary for the Board and perform all of the clerical duties in connection with the activities of said Board and also administer all oaths that are needed in connection with the members of the Board and activities thereof.

Section 6. PLACE OF MEETINGS, ETC. The first meeting of said Board shall be held at the conference room adjoining room 414, City Hall, Portland, Oregon, within ten (10) days of its appointment, on a date to be fixed by the Commissioner of Public Works. At said meeting the members present shall take the oath of office required of city officers and thereupon proceed to make arrangements to consider, study, survey, and investigate use of sewers in the City of Portland, for the purpose of recommending to the Council an equitable schedule of rates for sewer user service charges. Thereafter meetings shall be held at such times and places as may be designated by the Board, except that a regular meeting shall be held at 9:00 o'clock a.m. at the conference room adjoining room 414, City Hall, Portland, Oregon, on the first Tuesday of each month; provided that in case of a holiday on said Tuesday the succeeding judicial day shall apply.

Section 7. REPORTS OF BOARD. Said Board shall, within ninety (90) days of the effective date of this ordinance, make a report to the Council recommending an equitable schedule of rates for sewer user service charges for consideration by said Council, together with such other recommendations for the carrying out of the provisions of the charter amendment hereinbefore referred to, as the board may deem appropriate. Other reports, with recommendations, shall be made from time to time as the Board may deem advisable, and as the Council may direct and it

shall be the duty of the Board, on or before November 15th of each year, to make a report to the Council covering the fiscal year and therein include such recommendations as the members deem appropriate. The recommended schedule, or any amendments thereto, may be based upon the volume of water discharged by premises into the city sewers, or sewers connecting therewith, the degree and type of pollution thereof, and such other considerations and factors as the Board may deem appropriate and said schedule of rates shall be equitable and reasonable.

Section 8. PROCEDURE OF SAID BOARD. Any person having a matter which in his or her opinion should be considered by said Board for the purpose of enabling said Board to present to the Council a recommendation of an equitable schedule of rates for sewer user service charges, or an amendment to any such schedule, shall notify the City Engineer, in writing, of the matter which he believes said Board should consider. The City Engineer shall thereupon fix a time and place for a hearing thereon by said Board and so notify the Secretary and the person who has submitted a communication to him. At least five (5) days shall be allowed before the time for hearing after notice thereof shall have been given, unless the members of the Board and the person or persons submitting the matter for consideration shall agree to a different date. All notices may be given by mail, messenger, or personal service.

After a schedule of rates for sewer user service charges shall have been adopted by the Council, any person having a matter which in his or her opinion calls for action on the part of said Board relative to adjusting a sewer user service charge, shall present his or her complaint, in writing, to the City Engineer, stating the grounds of complaint. In case the matter complained of involves only a matter of detail which calls for no exercise of judgment concerning an equalization or adjustment of charges, the City Engineer shall so notify the applicant and proceed to make suitable correction, if any is needed. If the matter calls for an exercise of judgment he shall fix a time and place for a hearing by the Board and so notify the applicant and Secretary of said Board. In case the applicant differs from the City Engineer in regard to matters of detail he shall so notify the City Engineer, whereupon the City Engineer shall likewise fix a time and place for hearing thereon before the Board and notify the applicant and Secretary thereof. At least five (5) days shall be allowed before the time for hearing after notice thereof shall have been given, except that on consent of the applicant and the Board a hearing may be had at a different date. All notices may be given by mail, messenger or personal service.



Section 9. HEARING. The Secretary, upon receiving a notice of hearing as hereinbefore stated, shall notify each regular member of the Board, stating the time and place for hearing and the matter or matters to be considered. Any member of the Board who is personally or directly interested in any matter to be considered or unable to attend at the time, shall, upon receiving such notice, promptly advise the Secretary and thereupon the Secretary shall notify, in his or her place, one of the alternates, choosing each of said alternates in rotation. If any alternate so notified shall be personally or directly interested in the matter to be determined, or unable to attend at the time, he or she shall likewise notify the Secretary promptly, whereupon the Secretary shall notify another alternate as above provided and continue in such manner until three qualified members able to attend shall be available for service at the time and place designated for hearing. Notices between the Secretary and such persons may be given by telephone, personal interview or by mail. No hearing shall proceed unless three members are present and qualified to act. In the event that less than three members appear at the time and place of hearing, an adjournment shall be taken to another date to be fixed and announced by the member or members present, and in the event of no member being present, then the Secretary shall postpone the hearing to a time and place fixed and announced by the Secretary.

Section 10. At hearing held for the purpose of considering matters in connection with recommendations of an equitable schedule of rates or amendments thereto, the Board shall hear all pertinent matters submitted by or on behalf of the person or persons who have notified the City Engineer that they desire to have the Board consider said matter, together with testimony from such others as the Board may desire to hear.

At hearings at which application, adjustment and equalization of adopted rates are to be considered, the complainant shall be deemed to be the moving party and shall first present his or her evidence, and afterwards the City Engineer and others, if any, interested, may present evidence. All evidence shall be confined to the matter presented in the statement of complaint. Each person testifying shall first take oath that he or she will as to matters of fact, state the truth, the whole truth and nothing but the truth in regard to the matter then under investigation, and as to matters of judgment and opinion give an honest statement of judgment or opinion. The Board after hearing the evidence shall hear such argument as may be presented by or on behalf of the applicant or in opposition to the claim of the applicant. The Board shall have the right to limit the time allotted to argument,

provided that neither side shall be restricted to less than ten minutes. The chairman of the Board shall pass upon the admissibility of evidence submitted, subject to a right of exception, in which event a vote shall be taken by the Board thereon, a majority vote controlling. The Board may adopt rules and regulations as to procedural matters not in conflict with the provisions hereof. A liberal practice shall be followed to the end that all applicants shall have a fair and just hearing. The Board shall have a right to grant a rehearing upon a showing that probable error has been committed affecting the substantial rights of the applicant or of others. Application for such rehearing shall be in writing and presented to the Secretary within five days after the determination. Determinations by the Board, if not made verbally at the close of a hearing, shall be in writing and filed with the Secretary who shall promptly notify the interested parties thereof. The Board in making its determinations, whether in writing or verbally, shall express the reasons and grounds therefor. On petitions for a rehearing, no evidence or argument shall be taken or heard. The petitioner shall in his petition state the reasons and grounds relied upon by him in support thereof. In case a rehearing is allowed, evidence and argument may again be heard, but evidence previously taken may be regarded as before the Board and not retaken. The Board may fix the time and place for special and adjourned meetings.

Section 11. RECORDS. The secretary shall keep a record in journal form concerning the transactions of said Board.

Passed by the Council, Jan. 25, 1939

Mayor of the City of Portland

Attest:

Auditor of the City of Portland

Com'r. Bean



Resolution No. 21576

WHEREAS, by Ordinance No. 71912 provision is made for appointing a Board of Equalization with reference to rates for sewer user service charges; that Ernest C. Willard, R. B. Ambrose and Philip V. W. Fry are suitable persons to be appointed as regular members on said board; that A. A. Knowlton, A. L. Barbur and C. A. Rice are suitable persons to be appointed as alternates on said board; and that appointments should now be made so that proper action may be taken in connection with the enforcement and putting into effect of said Ordinance No. 71912; now, therefore,

BE IT RESOLVED, that said Ernest C. Willard, R. B. Ambrose and Philip V. W. Fry, are hereby appointed as regular members of said board, said Ernest C. Willard to serve for a period of one year and, therefore, act as chairman of the board during said period, and said R. B. Ambrose to serve for a period of two years, and said Philip V. W. Fry to serve for a period of three years.

BE IT FURTHER RESOLVED, that A. A. Knowlton, A. L. Barbur and C. A. Rice are hereby appointed as alternate members of said board, to serve in accordance with the terms and provisions of said Ordinance No. 71912.

Adopted by the Council Mar. 8, 1939

Will E. Gibson  
Auditor of the City of Portland

Portland, Oregon  
July 20, 1939

To the Honorable Mayor and  
Council of the City of Portland.

Gentlemen:

The Sewer Charge Equalization Board, appointed by Resolution No. 21576, adopted by the Council March 8, 1939, in accordance with the provisions of Ordinance No. 71912 as amended by Ordinance No. 72357, respectfully reports:

Since its appointment the Board has been busily engaged in conducting comprehensive studies, investigations and surveys of matters relating particularly to the use of City of Portland sewers and sewers connecting therewith, for the purpose of recommending fair, equitable and reasonable sewer user service charges.

Shortly after the Board was organized, meetings were arranged with the various industrial and commercial groups to which their representatives were invited to appear and to present any information and data which they felt would be of assistance in arriving at fair, equitable and reasonable sewer user service charges.

Representatives of clubs, lodges, associations, private schools, hospitals and the public schools also appeared and presented much information and data for consideration.

At the conclusion of the above meetings, two meetings were held to which home owners, wage earners and the general public were invited; the first on May 2nd and the second on May 9th in the Council Chamber.

The Board gave wide publicity of the time and place of all these meetings; the Secretary mailed over 1500 notices, many phone calls were made and numerous notices appeared in the Press. By this method a representative cross-section of all persons who will be called upon to pay a sewer user service charge has been given an opportunity to present to the Board such information and facts as said persons desired.



Keeping itself in an open frame of mind in considering all the information and data presented, the Board did not attempt to formulate for recommendation any charges until after all of said meetings had been held.

The Board has carefully considered all the available information before it, and recommends that sewer user service charges be established by the Council as specified herein.

The following recommended charges are based, except as hereinafter set forth, upon the quantity of water reaching the premises, both from the City of Portland water system and from private sources of supply, said charges to apply to all premises within and without the City of Portland subject to a sewer user service charge under the provisions of Section 347 of the city charter.

Rate per 100 cubic feet

	First 20,000 cu.ft. <u>per mo.</u>	Next 100,000 cu.ft. <u>per mo.</u>	All Over 120,000 cu.ft. <u>per mo.</u>
<u>Class 1.</u>			
Residential	\$0.03	\$0.02	\$0.01
Industrial and all other non-residential where sewer analyzes 1000 parts per million total solids or less	0.03	0.02	0.01
<u>Class 2.</u>			
Industrial and all other non-residential where sewage analyzes <u>over</u> 1000 parts per million totals solids	0.035	0.023	0.011

All water in excess of 5000 cubic feet per month used solely for refrigerating and cooling purposes or condensed from steam and put to no other use, shall bear a charge of 1/2 cent per 100 cubic feet.

The sewer user service charge for a dwelling during the months of June, July, August and September shall not exceed the monthly average of the charge for the previous four months; if there has been no four months charge prior to June, then it shall not exceed the average charge of the previous months less than four. Where there has been no charge for one month prior to June in any year, the said charge shall not exceed the minimum. This provision shall also apply to premises other than dwellings where increased use of water during said months is caused solely by irrigation.

Other water in excess of 5000 cubic feet per month reaching the premises but not reaching a city sewer, shall not bear a charge.

A minimum rate of 20 cents per month shall be established for any single account.

These recommended charges are in every instance below the limits fixed by the Act.

Based upon the use of water for the fiscal year of 1938, the Board estimates that these charges will produce a gross annual revenue of approximately \$275,000.00.

This Board will recommend to you changes in the charges which the Council establishes when in the light of future developments such changes appear to it to be in the public interest, and will likewise in the future make recommendations as to application and definition when the same appear to be necessary.

Obviously, the money which would be raised annually by this sewer user service charge can be well spent on any type of sewage disposal system that is finally approved and



determined by the Council. The Board believes that these recommended charges will produce the minimum amount of revenue necessary for the completion of a system within a reasonable length of time.

Respectfully submitted,

(Signed) Ernest C. Willard  
-----  
Regular Member and Chairman  
Sewer Charge Equalization Board

(Signed) R. B. Ambrose  
-----  
Regular Member

(Signed) Philip V. W. Fry  
-----  
Regular Member

Attached hereto and made a part of this report,  
are affidavits of Mr. Willard, Mr. Ambrose and Mr. Fry.

EXHIBIT VI

June 14, 1940

To the Council,

Gentlemen:

In reference to Council document #5638 - "Report on the Collection and Disposal of Sewage" of Portland, Oregon as submitted to the Council by the Board of Review under date of August 19th and referred to the Commissioner of Public Works on September 7th, I beg to call the Council's attention to the fact that it is the Council's duty as directed by the vote of the people to take action in regard to the matter of sewage disposal. The following necessary preliminary steps are reviewed and recommendations are made.

The Board of Review composed of Messrs. Corey, Donaldson, Green and Wolman met in this city August 7th to August 19th, inclusive. It summarized the results of its investigations and studies as follows:

"SUMMARY OF FINDINGS"

"The Board of Review records the following conclusions and recommendations:

"1. The Willamette River during periods of low flow, normally during the summer months, is heavily polluted, unsafe for bathing, unsuitable for recreation purposes and impossible for sustained fish and aquatic life.

"2. The City of Portland, through its various sewer outlets and the sewage resulting therefrom, is primarily responsible for this condition.

"3. The Willamette River reaches the city limits in none too good condition. It should undoubtedly be relieved of a large part of its domestic and industrial



In the discussion of estimates on the collection system the Board report states, "Existing data on normal and storm water flows are exceedingly meager. Estimates of cost at present available in the City Engineer's office are equally preliminary in character and insufficient in extent or in exploration.

"The preparation of an adequate plan for collection and the development of safe estimates of costs therefore will require many months and the expenditure of a reasonable amount of money. These facilities have not yet been accorded the City Engineer's office and until they are the exact method of design and construction and location of the main collection system cannot be definitely determined."

In its recommendations for initial steps to be taken the Board of Review makes the following suggestions"

"1. The City should provide the personnel and equipment sufficient to carry forward investigations on the following important details:

"(a) The determination of flows in all the trunk sewers, with particular reference to minimum rates of flow and maximum rates.

"(b) A detailed investigation of the present and ultimate population and industrial densities in each of the main interceptor areas.

"(c) An evaluation of present and future population and industrial densities in outlying areas within and without the city limits.

"(d) Field and laboratory investigation of the character and quantity of industrial and domestic wastes contiguous to the sewers.

"(e) The study of the possibility and practicability of constructing sewers of the separate type in critical areas so as to reduce continuous and recurring pumping charges and to make greater use of high level gravity interceptors.

"(f) The investigation of the detailed hydraulics of high level gravity and low level pumping interceptors.

"(g) The investigation of the number, location and type of storm water diversion regulators and screens.

"(h) The investigation of the existing sewerage system in order to prepare a schedule of replacements of

portions of the system, obsolescent either because of physical condition or inadequate size.

"(i) A comprehensive study of the engineering design and of the estimates of cost for a sewage treatment plant on the Columbia River.

"(j) Adequate borings for interceptor tunnel locations, sites of pumping stations and treatment plant, and river crossings.

"The work hereoutlined will take approximately a year and the costs will approach \$150,000.00."

The voters of Portland at the election on November 8, 1938 approved the construction of a sewage disposal system on a pay-as-you-go plan. The Board of Review after making considerable investigation of the proposed plan considered that a construction program of this magnitude is not feasible of total financing under the pay-as-you-go plan, on account of the long period of time which would be required.

We realize the inadequacy of existing data in the City Engineer's office as a basis for authoritative design and estimates on sewage disposal. In view of this fact and in line with the suggestion of the Board of Review, it is respectfully recommended that a sewer users' service charge, as provided for in Section 347 of the Charter, be levied at this time for the immediate purpose of providing funds for the necessary detailed field and office surveys and investigations and for preliminary design for the proposed program of sewage disposal. It is also recommended that this work be carried forward under the direction and supervision of the City Engineer and his engineering staff, and that authority to increase said personnel be granted by the Council from time to time as may be required for the proper execution of the work.

It is further recommended that the sewer user service charge be established for all users subject to such charge at the following rate:

Rate per 100 cu. ft.

<u>First</u> 20,000 cu.ft. <u>per mo.</u>	<u>Next</u> 100,000 cu.ft. <u>per mo.</u>	<u>All Over</u> 120,000 cu.ft. <u>per mo.</u>
\$0.015	\$0.01	\$0.005



All water in excess of 5000 cubic feet per month used solely for refrigerating and cooling purposes or condensed from steam and put to no other use, shall bear a charge of 1/4 cent per 100 cubic feet.

The sewer user service charge for a dwelling during the months of June, July, August and September shall not exceed the monthly average of the charge for the previous four months; if there has been no four months' charge prior to June, then it shall not exceed the average charge of the previous months less than four.

Where there has been no charge for one month prior to June in any year, the said charge shall not exceed the minimum. This provision shall also apply to premises other than dwellings where increased use of water during said months is caused solely by irrigation.

Other water in excess of 5000 cubic feet per month reaching the premises but not reaching a city sewer, shall not bear a charge.

A minimum rate of 10 cents per month shall be established for any single account.

This proposed rate is approximately one half the rate recommended by the Sewer Charge Equalisation Board in its report to the Council of July 20, 1939.

Based on the Board's estimate as to revenue which would be produced under the rates recommended in its July, 1939 report, the schedule herein suggested should produce approximately \$130,000 per year.

It is, therefore, recommended that the accompanying ordinance establishing a sewer users' service charge be approved by the Council.

Commissioner of Public Works

BSM EM

ORDINANCE NO. 74011

An Ordinance providing sewer user service charges and regulations in regard thereto, declaring certain acts unlawful, and imposing penalties.

The City of Portland does ordain as follows:

Section 1. RATE OF CHARGE.

Sewer user service charges pursuant to Section 347 of the City Charter as amended by the people November 8, 1938, are hereby assessed, levied and established and made effective on and after August 1, 1940, as herein stated, against each and every lot, tract or parcel of land using a city sewer or sewers or within 100 feet of an available sewer, and put to a use which requires sewage facilities though not connected therewith. Said charges are based, except as hereinafter set forth, upon the quantity of water reaching the premises, both from the City of Portland water system and from private sources of supply, including water from the ground of said premises or elsewhere. Said charge shall apply to all premises within or without the City of Portland subject to a sewer user service charge under the provisions of said Section 347. The rate of charge shall be 1 1/2¢ per 100 cubic feet for the first 20,000 cubic feet per month, 1¢ per 100 cubic feet for the next 100,000 cubic feet per month, and 1/2 of 1¢ per 100 cubic feet for all water per month over 120,000 cubic feet. This rate shall apply whether the premises be used for residential, industrial or other purposes.

Section 2. SPECIAL PROVISIONS AS TO RATES.

(a) Sewer user service charges for a dwelling during the months of June, July, August and September of each year, shall not exceed the monthly average of the charge for the previous four months; if there shall have been no four months' charge prior to June, then said service charge shall not exceed the average charge of the previous months less than four. Where there shall have been no charge for one month prior to June in any year, the said service charge shall not exceed the



minimum. This provision shall also apply to premises other than those used for dwellings where increased use of water during said months is caused solely by irrigation, no single account shall be less than 10¢ per month.

(b) Water in excess of 5,000 cubic feet per month used solely for refrigerating or cooling purposes or condensed from steam and put to no other use, shall bear a charge of 1/4 of 1¢ for 100 cubic feet provided that the owner or person in control of said premises provide a meter or other approved method for determining the amount of water so used.

(c) A metering or other approved method for determining the water above mentioned shall be deemed to be a metering at the place where the water enters the sewer, but in all such cases the owner or person in charge of said premises shall give the city inspectors the right of access at all reasonable times for the purpose of reading, inspecting, and/or testing the meter or device and determining therefrom the amount of water reaching the city sewer. In case property is not connected with any city sewer but is within 100 feet of such sewer and requires sewage facilities, the city engineer shall determine by the most practical means available or by estimation, the amount to be charged in accordance with the rates above stated but such determination shall be subject to review by the Board of Equalization.

(d) No charge is at present provided for ships, vessels or other water craft, house boats, boat houses, scow dwellings or premises where no sewage is produced or drainage to sewer required.

### Section 3. INDUSTRIES, ETC.

In case of industries, industrial plants, utilities and other business or enterprise where the use of water is such that a portion, or all of the water does not flow into a city sewer or any sewer connecting with a city sewer and the owner or person in charge of the premises makes proof of this fact and installs a meter or other approved method for determining the amount of water so used on the premises and not reaching a city sewer, no charge shall be made for such water in excess of 5,000 cubic feet per month.

#### Section 4. COMPUTING AND BILLING.

In cases where water bills apply the sewer user service charges provided in this ordinance shall be computed monthly at the same time as the water bills and added thereto and be due and payable on the dates and at the places provided for the payment of water bills. Where the first water bill after the sewer user service charge becomes effective, is computed as of a date less than one month after said sewer user service charge has become effective, said sewer user service charge shall be prorated according to the portion of the month for which it was effective. No sewer user service charge shall be added to a water bill rendered less than one month after said sewer user service charge has become effective, but in such cases said sewer user service charge shall be added to the next water bill rendered thereafter. In June, July, August and September an allowance shall be made as provided in section 2 (a). In cases where no water bill applies the computation and billing shall be as provided in sections 1, 2, and 8.

In cases where a change of ownership or occupancy of premises occurs, a billing of the sewer user service charge may be made along with the billing of the water charge following the fractional month basis as herein provided, except in cases where actual readings are obtained for the period covered, in which cases the actual meter readings shall be followed for making the charge.

#### Section 5. CERTAIN INSTALLATIONS, ETC. UNLAWFUL.

It shall be unlawful to so install, change, by-pass, adjust or alter any metering device or any piping arrangement connected therewith as to show the quantity of water reaching the city sewer to be less than the actual quantity.

#### Section 6. IDENTIFICATION OF INSPECTORS, ETC.

Each city employe going upon private premises for the purpose of reading, inspecting, and/or testing any metering device installed under the provisions of this ordinance, shall wear, in a conspicuous place, upon the exterior of his clothing a readily discernible badge identifying him as a Sewer User Service man. Each of



such employes shall also carry credentials from the Engineer of the Bureau of Water Works, which he shall show upon demand of any owner or person in charge of premises which he enters.

#### Section 7. SPECIAL FUND CREATED.

A special fund is hereby created to be known as the "Sewage Disposal Fund." All funds collected from the sewer user service charges shall be placed to the credit of this fund and also all other moneys that are received therefor. Disbursements from said fund shall be made only by warrant signed by the Auditor and Commissioner of Public Works. All receipts from the sale of salvaged products shall be placed to the credit of this fund. The moneys in this fund shall be used only for the purpose of paying the expenses of investigations, surveys, preparation of designs and plans, construction and/or maintenance and operation of a sewage disposal system under the provisions of section 347 of the City Charter.

#### Section 8. COLLECTION OF CHARGES.

The sewer user service charges shall become due, and be collected by the Bureau of Water Works coincident with water charges. In cases where no water bill is rendered said Bureau shall compute the sewer user service charges monthly and bill them quarterly except that charges exceeding the sum of \$3.00 per month shall be billed monthly. All bills shall be due and payable from the date issued. Any bill for a sewer user service charge, whether included with the water bill or otherwise, shall be delinquent when not paid after a period of ninety days from the date of issuance and shall bear interest at the rate of six per cent per annum from the date of delinquency. Not later than sixty days and not earlier than ninety days before the time for making the annual tax levy by the City Council, the Bureau of Water Works shall certify in quadruplicate a statement of all unpaid interest bearing bills for sewer user service charges, including interest thereon, to the City Auditor, together with a description of the property to which said bills apply, giving both the street number and legal description, and name of the reputed owner of the property. The Auditor shall, after having noted on the four originals of such statement the payments that have been made after receipt thereof, forward one of such originals to the

County Assessor of Multnomah County, Oregon, one to the County Clerk of said County, and one to the Sheriff of said County, having added to each thereof his certificate that the statement shows the payments made, and the charges unpaid against other property. The County Assessor shall thereupon extend on the assessment roll the unpaid charges against the respective properties to which they apply, in accordance with the provisions of Chapter 289 as the same has been or may hereafter be amended, of the 1933 Laws of Oregon, whereupon said unpaid charges shall be collected and the collections applied in the manner provided by such statute. Nothing contained herein shall prevent a collection by suit or action, and the City Attorney shall, upon direction of the Council, at any time after such charge shall have become delinquent, enter suit or action to collect the same. In case of suit a foreclosure and sale of the property affected may be applied for. In case of action a judgment against the person using the sewer shall be applied for in the amount due, together with interest, costs and disbursements.

#### Section 9. LIEN OF CHARGES.

Sewer user service charges shall be a lien against the property served from and after the date of billing and entry on the ledger records of the Bureau of Water Works, and said ledger records shall be made accessible for inspection by anyone interested in ascertaining the amount of such charges against the property.

#### Section 10. COMPENSATION TO BUREAU OF WATER WORKS.

The Bureau of Water Works, for its services, shall be paid monthly from the Sewage Disposal Fund for the actual cost of the work and expense incurred in performing the services provided in this ordinance, such charges to be subject each month to confirmation and direction of payment by the City Council.

#### Section 11. PENALTY.

Any person violating section 5 of this ordinance shall, upon conviction thereof, be punished by a fine



not exceeding Five Hundred Dollars (\$500.00) or imprisonment in the city jail for a period not exceeding six (6) months, or by both such fine and imprisonment.

Passed by the Council JUL 5 1940

JOSEPH K. CARSON, Jr.  
Mayor of the City of Portland.

Attest: WILL E. GIBSON  
Auditor of the City of Portland.

6-14-40  
Commissioner Bowes.

EXHIBIT VIII.

STATEMENT OF RECEIPTS & DISBURSEMENTS - SEWER USER SERVICE CHARGES

(From City Auditor's Records)

(a)                    Summary to Sept. 1, 1943

Total Receipts . . . . .	\$533,954.67
Liquid Assets . . . . .	<u>430,747.95</u>
Total Expenditures	\$103,206.72

(b)                    Annual Receipts - Sewer User Service Charge

1940 - \$ 34,357.47	(Oct., Nov., Dec.)
1941 - 183,391.77	(Calendar Year)
1942 - 90,464.13	(First 6 Months)
1942-1943 - 192,141.19	(Fiscal Year)
1943 - <u>33,600.11</u>	(July & Aug.)
Total	\$533,954.67 (To Sept. 1, 1943)

Sewage Disposal Fund Balance - Sept. 1, 1943

Cash on hand . . . . .	\$52,648.45
U. S. Gov't Bonds purchased 6-21-42. . . . .	99,974.00
U. S. Treasury Notes purchased 2-23-43 . . . . .	200,000.00
U. S. Gov't Bonds purchased 6-16-43. . . . .	<u>78,125.50</u>
Total	\$430,747.95
Total Expenditure	* <u>103,206.72</u>
	\$533,954.67

\* - Total Expenditures shown in Exhibit VIII, section (d) = \$104,231.88 according to records of Department of Public Works - All accrued August bills not cleared through Auditor's books.



EXHIBIT VIII.

(d)

BREAKDOWN OF EXPENDITURES - SEWAGE DISPOSAL PROJECT

Equipment. . . . .	\$2,817.23
Consulting Engineers . . . . .	6,789.16
Board of Equalization & Reporting of Meetings. . . . .	1,316.85
Laboratory Fees (Charlton Laboratories). . . . .	2,110.00
Water Bureau - Billing and Collection Costs. . . . .	15,405.37
"    "    - Refunds (Adjusted Bills). . . . .	344.61
"    "    - Service Installations in Stilling Wells . . . . .	640.66
Dept. Public Works, for Misc. Materials, Supplies, Equipment Rental, Shop Repairs, etc. . . . .	9,639.01

(Engineering Costs, Dept. Public Works)

1 - Sewage Flow Measurements and Rain Gauge Data and Calculations . . . . .	\$36,534.00	
2 - Sewage Sampling . . . . .	5,942.00	
3 - Population Studies. . . . .	3,500.00	
4 - Plans and Surveys for Interceptor Sewers	8,025.00	
5 - Studies of High Line Gravity Interceptors-	3,050.00	
6 - Study of Type of Storm Water Diversion Regulators . . . . .	1,650.00	
7 - Property Surveys for Water Usage. . . . .	925.00	
8 - Surveys for Irrigation Credits. . . . .	495.00	
9 - Setting up all Water Bureau Accounts for Sewer User Service Charges. . . . .	1,050.00	
10 - Making Key Wall Map of City's Sewers. . . . .	500.00	
11 - Miscellaneous . . . . .	1,497.99	
12 - Office Routine, Rates, Bill Adjustments, Board of Equalization Meetings, Inspection Trips, Analyzing New Accounts, Phone Calls, etc. . . . .	2,000.00	<u>65,168.99</u>
Total	\$104,231.88	

EXHIBIT X

SUMMARY OF WORK ACCOMPLISHED ON TEN IMMEDIATE  
STEPS RECOMMENDED IN BOARD OF REVIEW (WOLMAN) REPORT  
Page 25 - 26.

1. The City should provide the personnel and equipment sufficient to carry forward investigations on the following important details:

(a) The determination of flows in all the trunk sewers with particular reference to minimum rates of flow and maximum rates.

All major trunk sewers in the city have been gauged for at least a month and 15 of them for periods of from one to two years, of practically continuous gauging. This work has been performed in varying degrees since August 1941 and is now completed.

The determination of the maximum and minimum dry weather flows in all of the trunk sewers has been completed.

Of the 48 trunk sewers in which gauging were taken a total of over 9,300 daily charts have been prepared. Of these approximately 31% have been tabulated for calculating the daily flow of sewage with 15 minute intervals as the basis of calculations.

As the field work constitutes the major portion of the personnel involved in this part of the program, this investigation can be considered as approximately 90% complete.

(b) A detailed investigation of the present and ultimate population and industrial densities in each of the main interceptor areas.

(See answer under article (c) below)

(c) An evaluation of present and future population and industrial densities in outlying areas within and without the city limits.

Based upon the 1940 government census and using their detailed data wherein the populations for city blocks or other definite areas were given, we have closely approximated the residential population in



each of the trunk sewer drainage areas. An avaluation is now being made on the 1940 populations in the metropolitan sewer drainage area that could logically be served by Portland's treatment plant. Further studies will have to be made to fulfill all suggested work involved in paragraphs (b) and (c). The calculations of existing population (1940) has been quite accurate and has already involved several weeks of one man's time. The prognostications on future trends will take considerably less time. Would say this work was 75% complete.

(d) Field and laboratory investigations of the character and quantity of industrial and domestic wastes contiguous to the sewers.

All of the field work in connection with the necessary sampling of industrial and domestic wastes has been performed by our own field men - chainmen, instrumentmen and laborers. The Charleton Laboratories of this city performed all of the quantatative and quala-tative analyses. While there has been some sampling performed and analyses made on all of the trunk sewers, only ~~eleven~~ of the major sewers had a systematic and complete analysis made on a basis of 30-minute continuous sampling for a week's period on each of the trunk sewers as follows: 1 - Sullivan's Gulch; 2 - East Stark Street; 3 - N.E. 13th Ave; 4 - S.W. Mill Street; 5 - Lent's Trunk; 6 - Tanner Creek; 7 - Brooklyn Street; 8 - Front Street Interceptor, 9 - Insley Street - 10 - Holladay - 11-Alder St.

We estimate that while it will be necessary to undertake a considerable additional amount of work in this respect, probably 50% of the same has been completed.

(e) The study of the possibility and practicability of constructing sewers of the separate type in critical areas so as to reduce continuous and recurring pumping charges and to make greater use of high level gravity interceptors.

Practically all sewers constructed to date have been of the combined character and it would be impractical at this time to give serious consideration to the separation of the two systems due to the enormous expense involved. We have therefore given very little consideration to this phase of the work; however, in the design of future sewers it is being given consideration. High level gravity interceptors are being studied with the idea of utilizing them with the combined systems. Also see answer (f).

(f) The investigation of the detailed hydraulics of high level gravity and low level pumping interceptors.

Have made fairly comprehensive investigation of the hydraulics and relative costs of high level gravity and low level pumping interceptors. This includes designs and cost estimates for 20 suggested interceptor plans with a general report on each. Estimate 50% complete.

(g) The investigation of the number, location and type of storm water diversion regulators and screens.

Have investigated the number, location and type of storm water regulators. Have also constructed and operated experimental regulator of original design required by Portland conditions. Estimate 25% complete.

(h) The investigation of the existing sewerage system in order to prepare a schedule of replacements of portions of the system, obsolescent either because of physical condition or inadequate size.

No studies have been made on this work due to the fact that the replacements will have no direct bearing on the design or construction of the intercepting sewers and treatment plant, and can be given proper consideration at some future date.

(i) A comprehensive study of the engineering design and of the estimates of cost for a sewage treatment plant on the Columbia River.

Have made only preliminary studies and investigations for the design of a treatment plant. Estimate 10% complete.

(j) Adequate borings for interceptor tunnel locations, sites of pumping stations and treatment plant, and river crossings.

Have done some preliminary work to determine prospective locations for borings. No borings taken to date.



## EXHIBIT XI

Memorandum of Filings with the City Auditor Concerning  
the Sewage Disposal Project Subsequent to January 1, 1940.

1940		Cal.No.
Mar. 13	Report of Public Works on petition of Multnomah Civic Club and St. Johns Business Men's Club for appropriation to build sewage disposal plant. Adopt. File.	1104
13	Communication from A. Eng. Foundation re patent process for activated sludge; referred public Works	1089
20	Communication C.E. Forrester re fertilizer deposited in Columbia River. File	1215
Apr. 24	Communication A. F. Conway, Secretary, Ore. Affiliate A. Eng. Foundation re potential value of sewage recoverable from sewage in river. Referred Public Works	1861
24	Report of Public Works on communication from A. Eng. Foundation, Cal. 1089, re to certain patent process for activated sludge offering to waive royalty pay. Adopt. File	1897
May 15	Communication from E. S. Hoekman approve consideration by the Council of proposed sewage disposal project. Referred Public Works	2278
June 5	Communication from Oregon State Sanitary Authority change date of hearing from June 14 to June 21	2647
20	Report of Public Works trans. Ordinance re sewer user service charges, adopted	2983
	Ordinance providing for sewer user service charges. Read 1 and 2	2984
25	Published notice of assess Docket 94, page 159) See Sidewalk and Curb S-4-C-4886	
26	Communication from Multnomah Civic Club re sending Commissioner Bowes and City Engineer Ben S. Morrow to various cities to study sewage disposal plants and plans. Referred Public Works	3009
July 5	Report of City Attorney on citation from Sanitary Authority of Oregon re sewage disposal. File	3253
5	Ordinance providing for sewer user service charge #74011	3272
5	Communication from Oregon State Sanitary Authority re to plans submitted in response to authority's citation. File	3225

July 10	Communication from Portland Chapter Isaac Walton League re sewer service charge. Referred Public Works	3333
Aug. 29	Report Public Works re communication Portland Chapter Isaac Walton League. Referred Public Safety	4283
Sept.11	Communication from E. S. Hockman re sewage disposal system. File.	4452
Oct. 9	Report Public Works on communication from A.F. Conway Secretary, Oregon Affiliate A. Eng. Foundation re fertilizer from sewage. Adopt	4997
10	Ordinance to amend Section 3 of Ordinance 74011 sewer user charge so as to clarify the section #74458.	3107
Nov. 22	Report of Public Safety on report of Public Works on communication from Portland Chapter Issac Walton League. Adopt.	5729
Dec. 4	Protest of Veterans Administration re sewage service charge. Referred Public Works	5838
11	Ordinance authorizing Bureau of Water to make refunds a/c sewer user service charge. Referred Public Works	6041
18	Ordinance repealing Ordinance #74011 (sewer user service charge). Failed to pass	6155
18	Ordinance repealing Ordinance #74315 (certain positions) in Bureau of Water in connection with sewage disposal). Failed to pass	6156
26	Communication from Mrs. M. G. Glisby re repeal of sewage disposal ordinance whereby amount as added to water bill. File	6242
26	Ordinance authorizing the refund by Bureau of Water of sewer user service charge paid in error. Report of Water Works on. Adopt. File.	6280
1941		
Jan. 8	Ordinance appropriation \$5,000.00 for construction of sewage disposal system. Cont. 1/15/41.	180
8	Ordinance repealing Ordinance #74011 sewage disposal service charge. Failed to pass.	152
8	Ordinance creating positions in connection with sewer user service charge. Failed to pass.	153
9	Ordinance appropriate \$5,000.00 for construction of sewage disposal system #74803.	256



Jan.	8	Report of Sewer Charge Equalization Board re sewer user service charges. Taken from table and placed on file.	112
	22	Communication from Veterans Administration requesting their water bill be held in abeyance until settlement of their protest against sewer service charge be settled. Referred Public Utilities.	376
	29	Communication from Thad. L. Graves asking for exemption from sewer user service charge. Referred Public Works.	494
Feb.	19	Report of Public Works on communication from Thad. L. Graves re exemption from sewer user service charge at 4716 N. E. 19th Avenue. Adopt. File.	869
Oct.	29	Report of Sewer Charge Equalization Board for year 1941 recommending that sewer user service charge be suspended when the City Engineer certifies that sufficient funds are on hand to pay cost of engineer studies, etc. Adopt	5349
Nov.	26	Communication from Oregon State Sanitary Authority re collection of sewer charges. Referred Public Works and Public Utilities.	5854
Dec.	17	Resolution of the Oregon Roadside Council urging that the Sewer user service charge be not discontinued at this time. Referred Public Works.	6208
	31	Communication from Multnomah County Medical Society expressing approval of continuance of the sewage charge. Referred Public Works.	6445
1942			
Jan.	21	Report of Public Works on communication from Multnomah County Medical Society re continuance of sewer user service charge. Adopt. File.	266
	28	Report of Public Works on resolution of Oregon Roadside Council re sewer user service charge. Adopt. File.	403
	28	Report of Public Works and Public Utilities on communication from Oregon State Sanitary Authority re sewer user service charge. Adopt. File.	407
May	6	Communication from Dan Kellaheer re expenditures made in connection with sewage disposal fund. Referred Public Works.	2060
	13	Protest of Geo. T. Colton re paying sewage disposal charge. Referred Public Works and Public Utilities.	2184
	13	Report of Public Works on communication from Dan Kellaheer re sewage disposal expenditures. Adopt. File.	2205

1942

Cal. No.

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July 15	Report of Public Works on protest of Geo.T. Colton re sewage disposal charge. File. Adopt.	3292
Nov. 12	Communication from Harold F. Wendel, Chairman, Oregon State Sanitary Authority re sewer user service charge. Referred Public Works.	4867-1
Dec. 9	Report of Public Works on communication of Harold F. Wendel, State Sanitary Authority. Adopt.	5193
30	Communication of Mayor Riley trans. resolution of Oregon Roadside Defense Council urging full levy of sewer charge. Placed on file.	5400