

TRANSIT PLANNING

(MASS TRANSPORTATION)



VANCOUVER
TOWN PLANNING COMMISSION

JANUARY, 1946

A PRELIMINARY REPORT

UPON

TRANSIT

(MASS TRANSPORTATION)

VANCOUVER, BRITISH COLUMBIA

VANCOUVER
TOWN PLANNING
COMMISSION

VANCOUVER, BRITISH COLUMBIA



HARLAND BARTHOLOMEW AND ASSOCIATES
TOWN PLANNING CONSULTANTS
ST. LOUIS, MISSOURI
29th June, 1945

Price: \$0.25

VANCOUVER CITY COUNCIL
1945

Mayor, J. W. CORNETT

Aldermen

JOHN BENNETT GEORGE BUSCOMBE H. L. COREY W. D. GREYELL
CHARLES JONES GEORGE C. MILLER JACK PRICE CHARLES E. THOMPSON

City Officials

City Engineer CHARLES E. BRAKENRIDGE, M.E.I.C.
City Comptroller FRANK JONES
Corporation Counsel D. E. McTAGGART, B.A., K.C.
City Clerk RONALD THOMPSON
City Solicitor A. E. LORD, B.A.
Medical Health Officer S. STEWART MURRAY, M.D., D.P.H.
Building Inspector ANDREW HAGGART

VANCOUVER TOWN PLANNING COMMISSION

1945

Members

CHARLES T. HAMILTON, B.A.S.C., M.E.I.C., *Chairman*

H. V. JACKSON, *Vice-Chairman*

EARL M. BENNETT

FRANK E. BUCK, B.S.A.

J. C. MCPHERSON

JOSEPH BRIGGS

F. N. HAMILTON

W. R. OWEN

J. S. PORTER, M.R.A.I.C.

Ex-Officio Members

ALDERMAN H. L. COREY.....Representing Vancouver City Council

E. A. CLEVELAND, LL.D., M.E.I.C.....*Chairman*, Vancouver and Districts Joint
Sewerage and Drainage Board.

DON C. BROWNRepresenting Board of Park Commissioners

ELMORE MEREDITH, B.A.Representing Board of School Trustees

F. W. G. SERGANT.....Representing Vancouver Port Authority

Staff

J. ALEXANDER WALKER, B.A.S.C., C.E., M.E.I.C., *Executive Engineer*

F. MARJORIE ROSS, *Secretary*

TOWN PLANNING CONSULTANTS

HARLAND BARTHOLOMEW AND ASSOCIATES

HARLAND BARTHOLOMEW

RUSSELL H. RILEY

ELDRIDGE H. LOVELACE

Resident Engineer

J. ALEXANDER WALKER, B.A.S.C., C.E., M.E.I.C.

Staff, Vancouver

ELLIOT A. SCHMIDT, B.A.S.C.

JOHN H. F. EASSIE

M. ISOBEL BEVERIDGE

ZONING BY-LAW BOARD OF APPEAL

W. DALTON, *Chairman*

R. M. EDGAR

JOHN ELLIOTT, B.C.L.S.

ALBERT J. HARRISON, *Secretary*

HARLAND BARTHOLOMEW AND ASSOCIATES
CITY PLANNERS — CIVIL ENGINEERS — LANDSCAPE ARCHITECTS

317 NORTH ELEVENTH STREET
SAINT LOUIS 1, MISSOURI

September, 1945.

Town Planning Commission,
Vancouver, British Columbia.

Gentlemen:

In accordance with our agreement, we are pleased to submit the following report upon Transit. This is one of the series of reports that will comprise your revised Town Plan.

Transit facilities have a profound influence upon the distribution of population and the arrangement of the city. A transit plan such as that contained herein will be of great value in properly directing the growth of the city and in providing the maximum of conveniences and accessibility. Transit facilities are a particularly important influence in the maintenance of high values in the central business district.

We wish to express our appreciation for the information furnished and the excellent co-operation extended by the British Columbia Electric Railway Company, particularly that given by Mr. E. W. Arnott, Vice-President in charge of Transportation.

Respectfully submitted,

HARLAND BARTHOLOMEW AND ASSOCIATES.

By Harland Bartholomew.

INDEX

	<i>Page</i>
INTRODUCTION.....	7
Increasing Need for Transit Facilities in Large Cities.....	7
Facilities Influence Distribution of Population.....	8
Objectives of This Report.....	8
PRINCIPLES AND STANDARDS OF A MODERN TRANSIT SYSTEM.....	9
Type of Service.....	9
Area of Service.....	9
Alignment of Routes.....	9
Speed.....	10
Headways.....	10
EXISTING TRANSIT FACILITIES.....	11
DUPLICATION OF TRANSIT SERVICE.....	13
TRANSIT DATA.....	15
EXISTING ROUTES IN THE BUSINESS DISTRICT.....	17
INTERMEDIATE TRANSIT SYSTEM.....	19
ULTIMATE TRANSIT PLAN.....	24
PROPOSED ROUTES IN THE BUSINESS DISTRICT.....	27
MISCELLANEOUS RECOMMENDATIONS.....	29
Major Street Improvements.....	29
Loading Lanes.....	29
Fare Collectors.....	30
Limited Stops.....	30

INDEX OF PLATES

	<i>Page</i>
PLATE 1. LOCATION AND EXTENT OF PRESENT TRANSIT ROUTES.....	12
PLATE 2. DUPLICATION OF SERVICE.....	13
PLATE 3. PASSENGERS CARRIED AND SEATS FURNISHED.....	16
PLATE 4. CENTRAL BUSINESS DISTRICT ROUTES.....	17
PLATE 5. INTERMEDIATE TRANSIT PLAN.....	<i>Facing page</i> 19
PLATE 6. ULTIMATE TRANSIT PLAN.....	<i>Facing page</i> 24

INTRODUCTION

Transit facilities have exerted a major influence upon the growth and development of Vancouver. Without them the city could not have grown nearly as rapidly or as large as it now is. They will have an equal or even more important influence upon its growth in the future.

The advent of the automobile produced a serious competitor of transit systems. Prior to the war the transit facilities showed more loss than gain in this competition. For example, the number of passengers using the Vancouver system had decreased from a total of 57,429,953 in 1929 to 53,554,514 in 1939. However, they were by no means supplanted by the automobile except in very small communities. The recent war has assisted in revealing their great value.*

INCREASING NEED FOR TRANSIT FACILITIES IN LARGE CITIES

Even prior to the war there was a growing appreciation of the value of transit facilities, especially in the larger cities. The large number of motor cars so congested the streets that vehicular movement became slow and costly. The concentration of these automobiles within and near the business districts presented many difficult problems. There just was not enough street space to accommodate all the cars, the off-street parking facilities were inadequate, and many persons became discouraged with the time spent in searching for parking space and with the walking required between the parking space and their destination. This was one of the major causes for the trend toward decentralization in the central business district.

It was also becoming apparent that it would be financially and physically impossible to widen or improve enough streets and to provide parking facilities within or near the central business area to accommodate all of the private motor cars in a large urban area. Thus the most logical alternative solution was to improve transit facilities which required far less street space in transporting large volumes of passengers. The provision of fast, comfortable vehicles leading directly from residential sections to places of employment, shopping and recreation is imperative.

A recent trend in certain large cities also indicates the renewed interest in transit facilities. This is the planning of subways for transit routes in the most congested areas. Beyond the central area a few of the key routes are often proposed to be placed in subways or in open cuts, so that the vehicles can move rapidly and without interference. Toronto, Detroit, Cleveland and Washington are among the cities that have prepared plans for such improvements. The minimum size of the city, within which such expensive improvements could be economically justified, would vary according to many local conditions, but there is a definite trend toward substantial even though costly improvement of transit facilities.

*Due to wartime conditions the number of passengers increased to 109,781,216 in 1945.

FACILITIES INFLUENCE DISTRIBUTION OF POPULATION

Prior to the advent of the automobile, transit facilities were the only important means of mass transportation in urban areas. Consequently, people lived close to transit routes and the urban areas were compact. The automobile greatly increased the distance that people could travel between their homes and places of employment or other destinations, and urban residences immediately scattered over a wide area. One of the major reasons for the compact development of cities no longer prevailed.

This change in population pattern had a profound influence upon the transit facilities. They were no longer the only source of riding and their revenue decreased. Furthermore, the population became so widely scattered that it was not practicable for them to extend their lines—especially street car lines—to keep pace with this new growth. The motor bus assisted in overcoming this difficulty, but in many instances the population was so thinly spread that the bus route was not economical because of the long distance travelled to serve a small number of riders.

OBJECTIVES OF THIS REPORT

Because of Vancouver's present size and its anticipated future growth, substantial improvements will be necessary in the local transit facilities during the period covered by the revised Town Plan. This plan must thus provide a general guide for these improvements. It is primarily concerned with the location and extent of the routes. The business district and other major objectives of traffic must be properly served and the routes must be related to the desirable future pattern of population. The routes should also be located upon the major street system, since wide, direct and well paved streets are fundamental to an efficient transit system.

The type of transit facilities and operating details are the primary concern of the operating company rather than the Town Plan. Many technological improvements are now being made in the types of transit facilities and, therefore, it is impossible to forecast just what type would be most efficient for each route. The major problem is that the routes be properly located and that the operating company attempt to provide the most modern, convenient and efficient type of vehicle.

PRINCIPLES AND STANDARDS OF A MODERN TRANSIT SYSTEM

In designing a comprehensive transit system for Vancouver, certain general principles and standards should be followed insofar as local conditions permit. These may be summarized briefly as follows:

TYPE OF SERVICE

It is anticipated that Vancouver will become a great metropolitan centre of population. However, because of the present and probable future low density of population, an extensive system of subway or elevated transit routes would not prove economical. The major service must be provided by surface lines, but consideration should be given to utilizing express highways or improving private rights-of-way wherever possible for modified forms of rapid transit to the central area. The surface lines should be served by modern and efficient types of vehicles.

The type of vehicle or service will to a large extent depend upon the riding habit along each route. On very heavily travelled lines, street cars are the most efficient type of carrier because of the many passengers they can accommodate. On the lighter travelled routes, the motor bus is usually the most efficient and economical. In many cities the trolley coach has given excellent service.

AREA OF SERVICE

The generally accepted maximum walking distance from the transit routes is one-quarter mile. However, there must be enough population within this distance of the line to pay for its operation, and in sparsely settled areas, a one-half mile walking distance may be justified. In the main, transit service should be limited in residential sections to areas having, or which will ultimately have, a density of ten or more persons per acre.

The transit lines in the outer fringes of the city will naturally converge near the downtown business district. As the population density increases toward the city centre, this convergence is desirable since the more frequent service will encourage short distance travelling.

ALIGNMENT OF ROUTES

The ideal transit routes should radiate from the downtown district to all residential areas. With the exception of Kingsway, Vancouver has now no radial routes between the west, south and east major highways. Thus it is essential to concentrate lines upon the north and south streets leading to the business district and then extend them over the crosstown streets to provide direct service between residential sections and the shopping centre. This will also provide some crosstown service, but complete crosstown routes will probably be needed in the future. In

order to reduce turning movements within the congested area, all routes should preferably pass through, rather than loop back, in the central business area. With the majority of the routes passing through the downtown district, transferring from one route to another will be simplified.

SPEED

A fast schedule is economical for both riders and operators of a transit system. Fewer units will efficiently serve an area if travelling on a fast rather than a slow schedule and there is the obvious advantage of saving the time of passengers. Faster service can result from the elimination of unnecessary turning movements and from straight, direct routing over wide streets. An excess number of stops for loading and discharging passengers also prevents speedy movement. The prohibition of parking at street car and bus stops can save many minutes and help to speed service. It will also assist in the prevention of downtown traffic congestion and of accidents.

At busy intersections during rush hours, service is frequently speeded where fare collectors are stationed to assist the operators in selling tickets, making change, collecting tickets and issuing transfers.

HEADWAYS

Fifteen-minute intervals between street cars and buses on the same line are generally regarded as the maximum desirable spacing for satisfactory services, although twenty-minute headways during non-rush hours and on Sundays and holidays may suffice on some of the outlying street car lines and feeder bus lines. Longer intervals require a knowledge of schedules, and such service is generally acknowledged to be inadequate. Much more frequent service must be furnished on heavily travelled lines. In many districts the provision of more frequent service encourages additional passengers. Headways will naturally vary, according to the demands of different periods of the day and the riding habits of the various districts.

EXISTING TRANSIT FACILITIES

Plate Number 1 shows the location and extent of the transit routes now serving the City of Vancouver. The service consists of interurban lines, street cars, and motor busses. Each of these are shown by a different indication on the plan.

The three interurban lines extend beyond the present corporate limits and provide service to portions of the metropolitan area. The majority of these routings utilize private rights-of-way, although the Burnaby Lake and the Central Park lines also travel on city streets. The interurban lines are well located in relation to urban development but none of them extend to the centre of the business district and most of the interurban passengers have to transfer to reach the central section.

Street car lines provide by far the larger proportion of the local transit service. There are 62 miles of streets containing either single or double tracks while the bus routes are located on only 20 miles of streets. Thus, more than 75 per cent of local transit routes are street car operations and actually even a larger proportion of the total route mileage is represented by street cars since a number of lines travel over the same streets. For example, in 1944 the street cars operated a total of 14,305,889 miles while motor busses travelled only 1,511,055 miles.

Most of the street car routes lead from the residential districts to the downtown area. However, a few, such as the southerly end of the Main and the Nanaimo lines, serve as feeder or shuttle services. The favourable location of the street car routes in relation to the population, and the fact that they provide direct service to the downtown area, are the reasons why they carry such a large proportion of the total riders. The majority of the transit routes are located on existing or proposed major streets, thus utilizing the wider and better improved pavement which is particularly important because of the fogs which occur during the winter months.

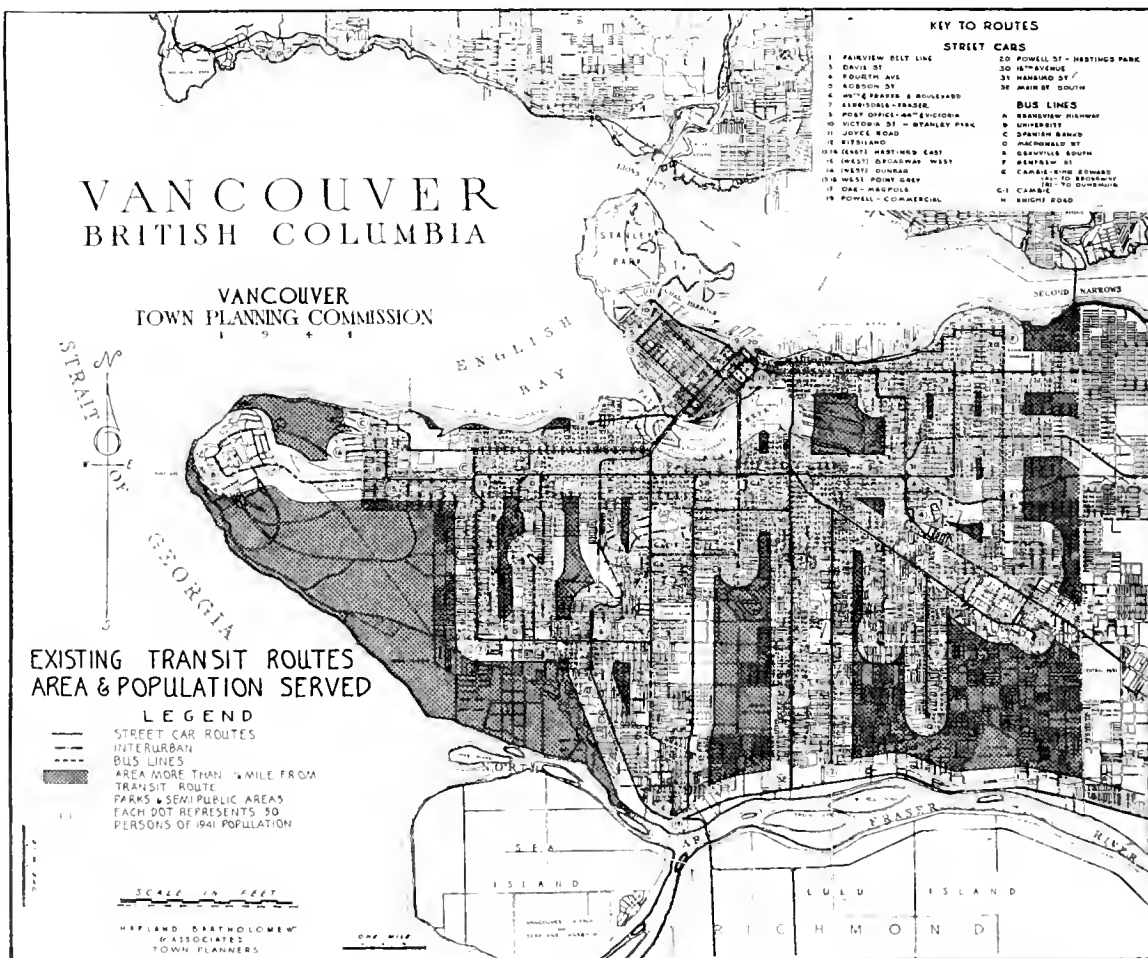
Practically all of the bus routes are feeder lines providing service from the outlying residential districts to a street car line where the passengers then transfer to go downtown or to other destinations. The only exception is the Cambie Street line and even this routing has been changed from time to time during the war emergency.

Nearly all of the street car lines extend through rather than loop in the central business district. The only exceptions are the Kitsilano, and the Powell and Oak Street car lines. In the central business area the street car routes utilize two north and south and two east and west streets. Granville Street is the most heavily travelled transit route in this area but the routing of lines over Richard Street has tended to avoid excessive congestion on the two north and south routes. The most heavily travelled transit route in the entire city is Main Street immediately south of Hastings Street, but even here congestion has not become unduly excessive.

Plate Number 1 also graphically shows areas within the corporate limits that are more than a quarter of a mile from a transit route, and dots indicate the population living in both the served and unserved areas. The greatest amount of unserved area lies in the southeast and in the southwest portions of the city, but

in these areas there is a very small amount of population. Of the approximately 28,000 acres within the city only 7,025 acres are more than one-quarter of a mile from a transit line, and of this area about 850 acres are occupied by parks, cemeteries and public uses. Thus only 22 per cent of the city's total area is now unserved and less than 20,000 persons or about 7.25 per cent of the 1941 population are beyond the quarter of a mile line. This is a surprisingly small unserved population in such a large area which is so thinly populated in many districts. Some of the routes, such as Oak Street, travel a long distance, approximately from 33rd to 59th Avenues, while serving a very small number of persons.

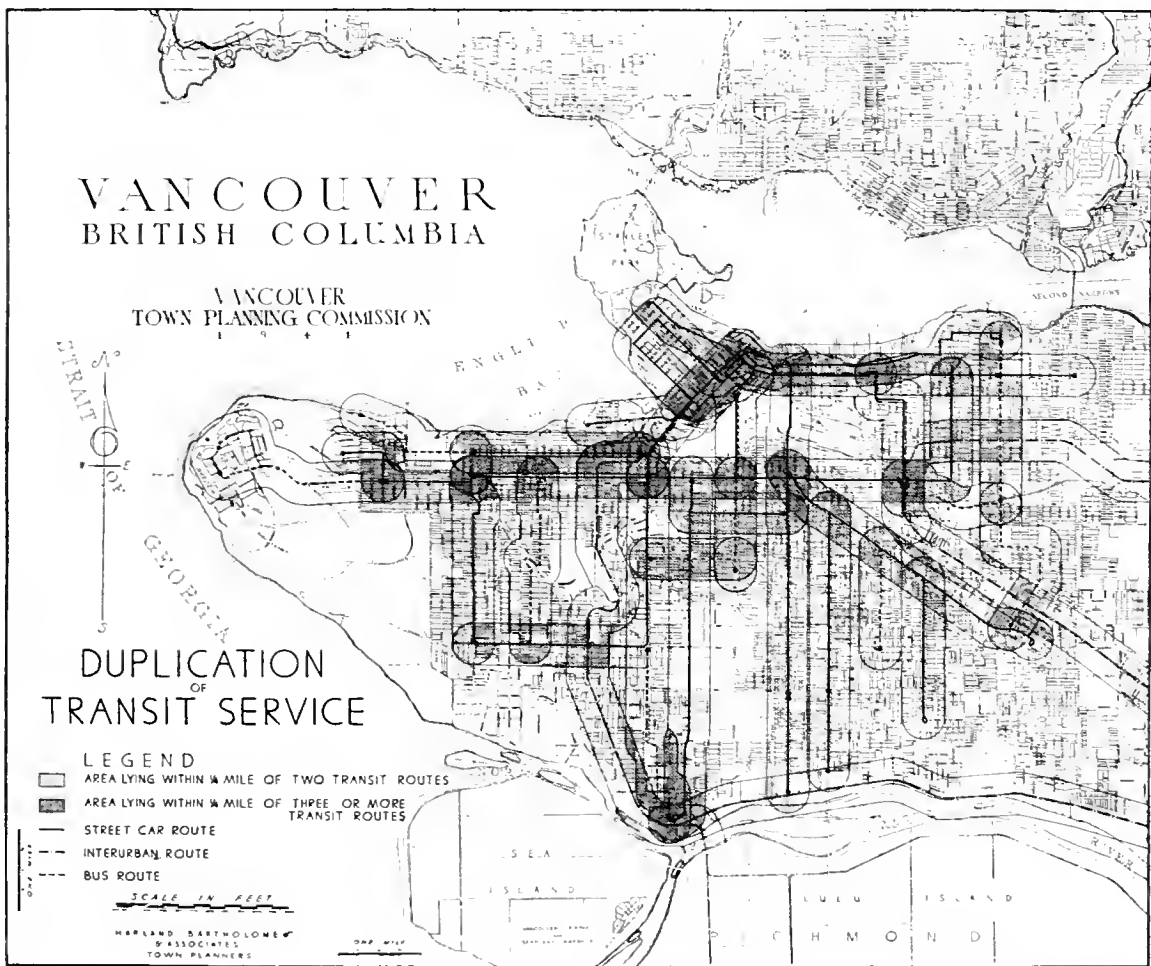
While the present transit system now serves a great percentage of the total population, extensions and improvements must be made in the future. Some of the lines must be made more direct, feeder service should be eliminated wherever possible, and rapid service should be gradually extended to encourage compact development in the outlying sections.



DUPLICATION OF TRANSIT SERVICE

Plate Number 2 shows the duplication of transit service within the City of Vancouver. Any area that is within a quarter of a mile of two or more transit lines is considered to have duplicated service. However, when two lines operate upon the same street, it is considered as improved rather than duplicated service. An excessive amount of duplication is harmful to the over-all transit system in that it increases operating cost and tends to prevent logical expansions and improvements. The accompanying plan shows areas, single-hatched that are within a quarter of a mile of two transit lines, and cross-hatched that are within a quarter of a mile of three or more transit lines.

There is very little duplication of service in the entire city. Most of it is found within and near the central business district which is unavoidable and, in



fact, is desirable. Here the lines converge to enter a comparatively small area and must necessarily be close together. The other main source of duplication is found where transit lines cross each other in the outlying sections and where the feeder bus lines join the main transit route. This is not an especially harmful situation although crossings should be avoided wherever possible.

The two principal areas of duplicated service in the outlying sections, other than those above described, are between Fourth Avenue and Broadway, west of Granville Street, and between Hastings and Powell Streets in the northeastern part of the city. While these two paralleling lines are too close together, their location is the result of topography and the location of major streets. It is not particularly serious and can be continued in the future. The plan clearly indicates no tendency for an excessive amount of service in any one area at the expense of the entire city.

TRANSIT DATA

Plate Number 3 graphically shows the comparative volume of passengers carried and seats furnished for each line during an average day in April, 1944. Similar data is shown for an average day in the corresponding month in 1939.

The Plate reveals two outstanding conditions: First, street cars perform a more important function than busses—they carried about 88 per cent of all the passengers during the average day in 1944 and 83 per cent of the passengers in 1939; second, the Plate indicates the substantial increase in the riding habit that has occurred between 1939 and 1944. Practically all lines now carry nearly twice as many passengers as they did in the earlier period and only one line, the Sixteenth Avenue route, has shown a loss rather than a large increase. This was due to the change in routing. Where this line now serves as a feeder it formerly extended directly to the business district.

The Hastings Street lines and their various extensions and connections which include routes, Numbers 13, 14, 15 and 16, carried the largest number of riders—65,206 during an average day. The Fraser Street routes, Numbers 6 and 7, are next with 40,132 passengers. Both lines travel well populated sections.

In contrast with these heavily utilized street cars is the small number of passengers carried on the bus lines. Only one bus line, Cambie Street, carried more than 5,000 passengers during the average day, and one line, namely, Knight Street, carried less than 1,000 passengers. The small number of passengers carried on the Sixteenth Avenue line clearly indicates the desire of passengers to utilize direct routes to the central area.

Although the Hastings and Fraser Streets lines carried the largest number of passengers, they were not the most economical from the standpoint of the operating company. On these lines there were only 6.8 and 5.8 revenue passengers per mile of operation, while on the Robson-Broadway, the Fairview and the Davie Street car lines, the number of revenue passengers per mile was 10.5, 9.9 and 8.6, respectively. The Hastings and the Fraser Street lines travel long distances to carry their passengers, while the three latter lines travel a comparatively shorter distance and through some of the most heavily populated sections of the city.

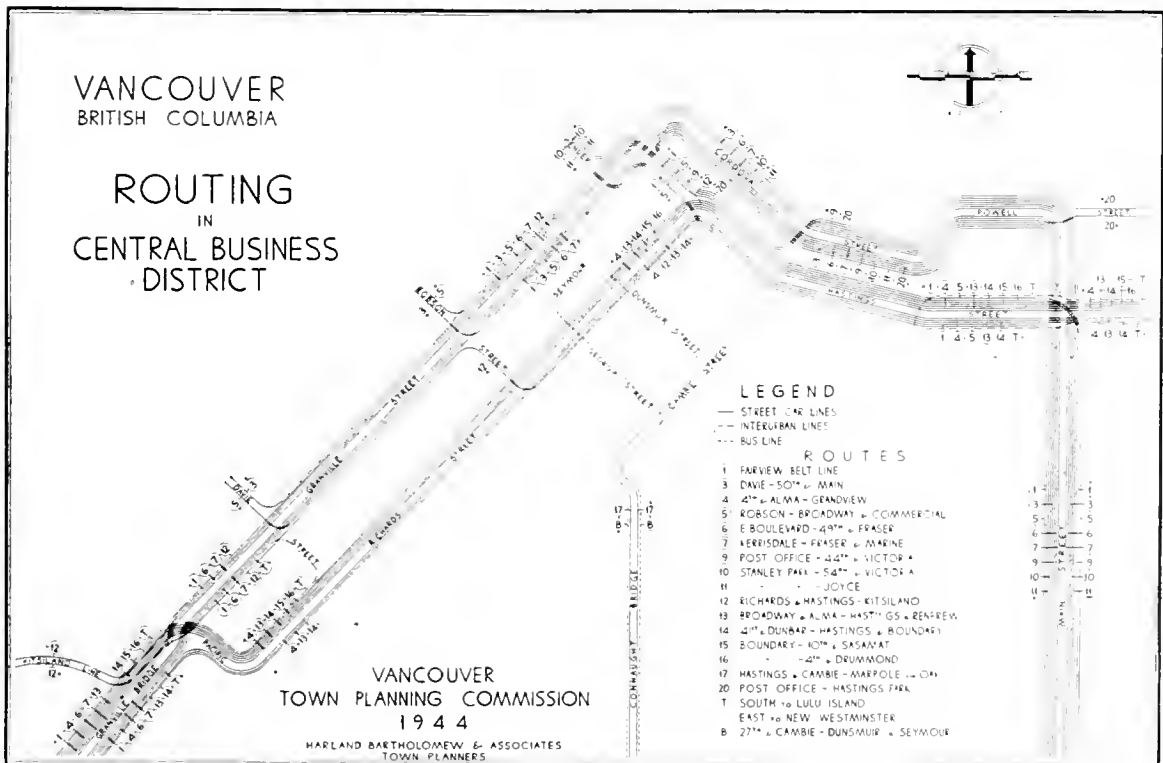
The number of passengers carried per mile of operation is obviously the most important means of determining or judging the economical efficiency of various routes. This in turn determines the total cost, gross income and the amount that would be available to improve and modernize service. They clearly reveal that the compact and more intensively populated sections are the most economical in which to operate transit facilities. They further indicate that if the city is to have a satisfactory transit system in the future, every effort must be made to keep a compact and economical population pattern rather than to permit it to scatter thinly over large areas. For example, the Oak Street line has the lowest revenue passengers per mile record of any street car line in the city entirely because it travels long distances through vacant or sparsely settled areas. It would be financially impractical to provide modern rapid transit service in the future for convenient access to all if the population is widely scattered.

EXISTING ROUTES IN THE BUSINESS DISTRICT

Plate Number 4 shows the location of the existing transit lines in the central business district. In general the location of the routes within this area is good. They are near the centre of the district and thus the riders are brought to their desired destinations as conveniently as possible. A large number of the routes continue through rather than loop in the district, which is considered good transit routing practice. As previously indicated, it is desirable for vehicular traffic to approach the central business district on distributor streets such as Burrard Street and the proposed Cambie Street distributor, and for transit routes to enter the heart of the shopping centre.

Granville Street contains the largest number of routes and operations. While this street is not unduly congested with transit facilities, it has about reached its normal capacity. In the future, routings should be located on parallel streets to avoid excessive congestion and delays along this important business street. The shape of the business district involves some left-hand turning movements even on through routes, but these are almost impossible to avoid.

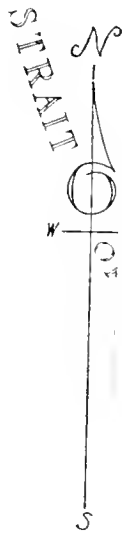
Another advantage of the present routings is that each route traverses a substantial portion of the entire district. Passengers can conveniently reach any



desired downtown destination with a minimum amount of walking. The large number of routes passing through the northern and older portion of the centre is especially fortunate.

The most serious objection to the present transit routes within the business district is that the interurban lines stop at the outskirts. Persons using these routes and desiring to reach the centre of the shopping district must transfer to another transit line. As indicated later, the operation upon these interurban lines might be by street cars rather than interurbans so that they could continue to and through the business district. It would be neither economical nor desirable to rebuild the terminals nearer the centre of the district.

V.
BF



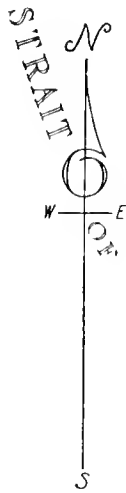
INTE
TRAN

- IN
- ST
- - - TR
- - - M

ONE MILE

VANCOUVER BRITISH COLUMBIA

VANCOUVER
TOWN PLANNING COMMISSION
1 9 4 5



INTERMEDIATE TRANSIT PLAN

LEGEND

- INTERURBAN LINES
- STREET CAR ROUTES
- TROLLEY COACH ROUTES
- MOTOR BUS ROUTES

SCALE IN FEET

HARLAND BARTHOLOMEW
& ASSOCIATES
TOWN PLANNERS

ONE MILE

SEA

ISLAND

VANCOUVER AIRPORT
SEAPLANE HARBOUR

LULU

ISLAND

RICHMOND

EACH DOT
REPRESENTS 50
PERSONS OF THE
PRESENT POPULATION

THE INTERMEDIATE TRANSIT SYSTEM

The transit system necessary to serve the future population of Vancouver will be gradually developed over a long period. Individual changes and re-routings will depend upon numerous factors, such as the location of new residential and industrial developments and upon the opening and improvement of major streets. The availability of new transit equipment will also influence the time within which the first changes can be initiated. Thus, it is impossible to now determine the exact sequence in which each step will be taken or the time each change will be made.

Fortunately, the timing of the changes is not as important as is the fact that each change should be made, insofar as possible, in accordance with the plan for the ultimate transit system. Transit routes should not be continually shifted from street to street. Street improvement programs are difficult to plan under such shifting and the constant changes do not encourage stabilized residential areas. Also there will be many objections from property owners even though the line may have been established for only a few years.

Plate Number 5 shows the suggested routings for an intermediate transit system for Vancouver that is a fundamental step toward the improvement and development of the ultimate system which is shown on Plate Number 6. This plan not only indicates the location and general extent of the various routes but also suggests the type of service which could logically be provided on each line. It should be reiterated, however, that the Town Plan is more concerned with the location and extent of the service than it is with the type of service. Improved equipment or other changing conditions may make it desirable to provide different types of operating equipment than is suggested on the plan, but there should be many substantial reasons before a change should be permitted in the location of the routes. Plate Number 5 also shows the 1941 distribution of population and indicates the extent to which the population would be conveniently served.

There is no exact time limit within which all the details of this plan should be completed. Many of the present routes remain unchanged and some of the proposed new routes can be established as soon as new equipment can be secured. In other instances, street openings and street pavements are necessary before the routes can be operated. The plan should serve as a general guide for the transit changes during the next five or ten years.

While some changes and minor readjustments will be necessary between the routings under this plan and those proposed for the ultimate system, the intermediate routings are very closely co-ordinated with the latter. Special care has been taken to establish transit routes upon streets that should ultimately accommodate such facilities. Another objective of the intermediate plan has been to provide more direct service between the residential areas and the business district and thus eliminate much transferring and delays. However, there are certain sections of the city, such as the southeastern and eastern portions, where the population is so scattered and thinly spread that feeder busses are about the only type of service that can be

justified for many years. In general, the intermediate plan provides convenient and direct service for a much larger population than the present system.

A brief discussion of each route follows:

INTERURBAN ROUTES

A. Vancouver-Marpole-Lulu Island Route. This is the same as the present Marpole Interurban line. No changes are proposed although it is unfortunate that it does not extend further into the downtown business district. The operation of both freight and transit service over this route presents many operating problems, but efforts should be made in the future to provide the transit service by street cars so that the vehicles could extend through to the business district and possibly connect with the Central Park Interurban line serving the southeastern part of the city.

It is possible that increased freight operation may soon seriously interfere with interurban service between the Marpole interurban district and New Westminster. It would be entirely satisfactory to substitute motor bus service for this portion of the line, such bus line to be located upon Marine Drive.

B. This line is the same as the present Central Park Interurban line. As mentioned above, it would be desirable if the service could be provided by street cars and thus operate to and through the downtown business district. Such operation would also eliminate the need for route Number 4 which involves street car service upon the line as far as Cedar Cottage.

STREET CAR ROUTES

1. AND 1A. This route is the same as the present lines now found on Hastings Street, West Broadway and Dunbar Street and no changes are proposed thereon. In the western part of the city it would be operated as a split route with one portion extending west of Tenth Avenue and then to Fourth Avenue and terminating at Blanca Street while the other portion extends south on Dunbar Street. This will probably be one of the last street car lines to be abandoned.

2. 2A, AND 2B. In the eastern portion of the city the routes Numbers 2 and 2A are the same as the present Kingsway-Victoria Drive routes. The proposed route 2B is also the same as the present Broadway East line. All these would join on Kingsway and operate as at present to the downtown business district. Some of these cars should continue through the central business district and extend westward along the existing street car line on Fourth Avenue. This will provide a through route, although less service will be needed along the Fourth Avenue line and a number of cars will have to be looped in the central business district. Street car operation will probably be desirable on these routes during the period covered by this plan.

3. AND 3A. In the eastern portion of the city these routes are also the same as the present Fraser Street and the present Main Street lines except that the present shuttle service on the extreme southern part of Main Street will eventually be replaced by a bus route. It is also recommended that these routes extend through the business district and connect with the present street car line on Pender Street that extends to Stanley Park.

4. This is the same as the present Grandview line. As previously indicated it would be desirable for this route to be supplanted by street car operation upon the entire Central Park Interurban line. Until such type of operation is established the street cars on this line can loop in the central business district.

TROLLEY COACH ROUTES

5. This is the same as the present Powell Street line. Operation is proposed, however, to be provided by trolley coach rather than by street cars. After the trolley coach route is established, the line should eventually be extended a short distance eastward to provide service for residences located northeast of the Exhibition Grounds.

6, AND 6A. These two trolley coach lines will replace the present Oak and Cambie Street lines. However, the new line on both streets should not extend as far south as the present street car line because of the extensive vacant areas. The line on Cambie Street should be extended southward as residential development occurs in this area but it undoubtedly will be many years before an extension on Oak Street beyond the Shaughnessy Heights Golf Course can be justified.

7. This proposed trolley coach operation would replace the Granville Street street car and the feeder bus which extends southward to the end of the line. It is not recommended, however, that trolley coach operation be established on this line until the new Granville Street Bridge is constructed. The need for this type of service on Granville Street is an important factor that should influence the early improvement of this bridge.

Granville Street is one of the most logical locations for a trolley coach route. The elimination of the street car tracks would greatly improve vehicular movement and would materially reduce hazards to the transit riders by permitting curb loading. The proposed type of operation would also permit the route to be extended southward so that direct service to the downtown area could be made available to a rapidly developing residential district.

8. This route will serve the heavily populated area west of the central business district. The location of the route is the same as the present Davie-Robson street car line. While this route may eventually be connected with some of the other trolley coach lines, it will probably have to loop in the central business district for a number of years.

MOTOR BUS ROUTES

9. This route is, in general, a combination of the present Mackenzie-Macdonald bus line and the Kitsilano car line. Some connections and extensions are necessary to make this a direct route to the downtown business district. The provision of this direct service for the well developed residential section south of Broadway is a very important improvement in the intermediate transit system.

The line is shown on the accompanying plan as a motor bus route and there are several important reasons why this type of operation should eventually be made available on the major portion of this route. However, this is also a logical location for one of the first trolley coach operations and it is realized that such operation should not be established on the present Granville Street bridge. It is,

therefore, recommended that this line be first operated as a trolley coach line to extend over the Burrard Street bridge and then on to Howe Street in the downtown area. However, this operation should be permitted only until the new Granville Street bridge is completed. Thereafter, the trolley lines would be removed from the Burrard Street bridge and all future trolley coach operation would be over the Granville Street bridge. It is further recommended that ultimately only motor bus operation should be permitted over the Burrard Street bridge.

After the trolley coach operation has been shifted from the Burrard Street to the Granville Street bridge, trolley coaches could still be operated on the southern half of this route by extending the route out Granville Street to Sixteenth Avenue and then over Sixteenth Avenue to Macdonald and Mackenzie Streets. The additional service provided by such a route would be desirable.

10. AND 10A. This is a new motor bus route and will provide direct service from the downtown area to the central eastern part of the city. From the downtown business district it would extend over the Georgia Street Viaduct to Main Street and then along Terminal and First Avenues. It will replace the present Burnaby Lake Interurban line. New street openings and paving will be necessary before the line can be extended beyond Nanaimo Street. However, such improvements are also necessary for vehicular traffic.

It will be noted that, in addition to extending the route eastwardly, it can also extend north and south along Rupert Street and thus provide direct service for this outlying portion of the city. However, the areas along the southern portion of Rupert Street are so thinly populated that it will be several years before any service other than feeder bus can be justified therein.

11. This is a feeder bus line that is similar to the present line serving the University area. The loop and route near the University should be extended as new development occurs.

12. This is also a feeder bus line and the route is quite similar to the present service to the Spanish Banks area. It should be relocated upon the new major street alignment when this improvement is completed. The major service on this line is required during the summer months when persons desire to reach the park and recreational areas along the south side of English Bay.

13. This feeder bus line will provide some cross-town service and will also replace the present street car shuttle service on the extreme southern portion of Main Street. The installation of this line on Main Street should probably be delayed until additional paving is provided. Until new paving is provided which will permit the proposed bus service on Knight Street to be extended south of 41st Avenue, it will be possible to give some transit service in this general area by extending this proposed bus route to about Gordon Park or possibly to Victoria Drive.

14. This is a short feeder line operated between the proposed Granville Street trolley coach route and the southern end of the proposed Cambie Street route. It thus affords riders the choice of two routes in reaching the business district. Its location on Oak Street will replace the present street car service and its location on 49th Avenue and Cambie Street will provide service in an area that is now entirely unserved.

15. This is a new bus route that should supplant a portion of the present

street car line on Broadway. This entire area is or will be within a reasonable walking distance of routes extending directly to the business district and there is no necessity of having a transit route on this street that travels in a loop to reach the central shopping centre. However, crosstown service should be established on Broadway and this line extending between Granville Street and Kingsway will be the first portion of the crosstown route.

Some consideration has been given to the establishment of a crosstown route on Twelfth Avenue. This is not a desirable location for a transit line. There has always been a transit route on Broadway and transit service should be continued on this street especially because of its desirable location. Twelfth Avenue is entirely too close to Broadway for an additional transit line and would provide unnecessary duplication.

16. This is another feeder line, a portion of which is similar to the present feeder route on Knight Street. It should be operated as a motor bus line, but instead of terminating at Kingsway it should be extended north and east so as to intersect with the Central Park Interurban and the Grandview street car line. As previously discussed, it should also be extended south of 41st Avenue to about 57th Avenue whenever street improvement permits.

17. This is also a feeder bus line that will supplant the present shuttle street car service on East Broadway and Nanaimo Street. It should, however, be extended north of Hastings Street to intersect the Powell Street line which will give improved service to the waterfront and harbour area.

18. A cross-town route in the more outlying portions soon will be needed in Vancouver. It is recommended that the major portion of this route be located on 41st Avenue. It should extend from Dunbar Street on the west, eastward to Victoria Drive and then by certain existing streets should be extended to Renfrew Street and then northward to the Powell Street line near the Exhibition Grounds. Major street improvements will eventually afford an improved location for this route between Renfrew Street and 41st Avenue, but in the meantime minor streets can be utilized. This route should provide excellent service in permitting persons to travel from one section to another without being forced to go long distances before they can make a transfer to a line serving their destination. It should also be especially helpful in carrying persons between their homes and places of employment.

The first portion of the 41st Avenue crosstown route could be immediately established between Dunbar Street and the Marpole Interurban as a shuttle bus line. This would permit the single-track street car line to be abandoned west of the interurban line. Because of the inadequate street improvement along 41st Avenue and the sparsely settled areas adjoining this route, the additional portions may not be needed for several years. In the meantime it will undoubtedly be desirable to establish a crosstown line on King Edward Avenue, between Arbutus Street and Kingsway. Any permission to establish such a route on King Edward Avenue should be granted, however, with the understanding that it would be transferred to 41st Avenue just as soon as street improvements permit and urban developments warrant. Furthermore, it should be understood that a crosstown route would not thereafter be continued on King Edward Avenue. The crosstown routes on Broadway and 41st Avenue would be entirely adequate to serve the future population.

ULTIMATE TRANSIT SYSTEM

The proposed transit system which can ultimately serve the City of Vancouver is shown on Plate Number 6. This is a long range plan and must be developed gradually during the next twenty-five years. It has been carefully co-ordinated with the intermediate plan discussed in the preceding section and the ultimate plan is primarily an extension of the routing that should be developed in the intermediate stages.

The plan also shows the desirable distribution of the future population. Any area that is more than one-quarter of a mile from a future transit route is shown by a hatched indication. There is only a small amount of unserved area and practically all of the future population will be within reasonable walking distance of a transit line.

No recommendations are made regarding the type of service that should be provided on these routes. It is impossible to forecast at this time just what type of operation would prove most desirable in the next fifteen or twenty-five years. The location of the routes rather than the operating details is the important factor. It is expected that street car operation will continue for many years on the more heavily travelled routes but there is little or no possibility of building new tracks to provide street car service in outlying sections. Trolley coaches, motor busses or similar operating facilities will undoubtedly provide transit service for the new and extended routes.

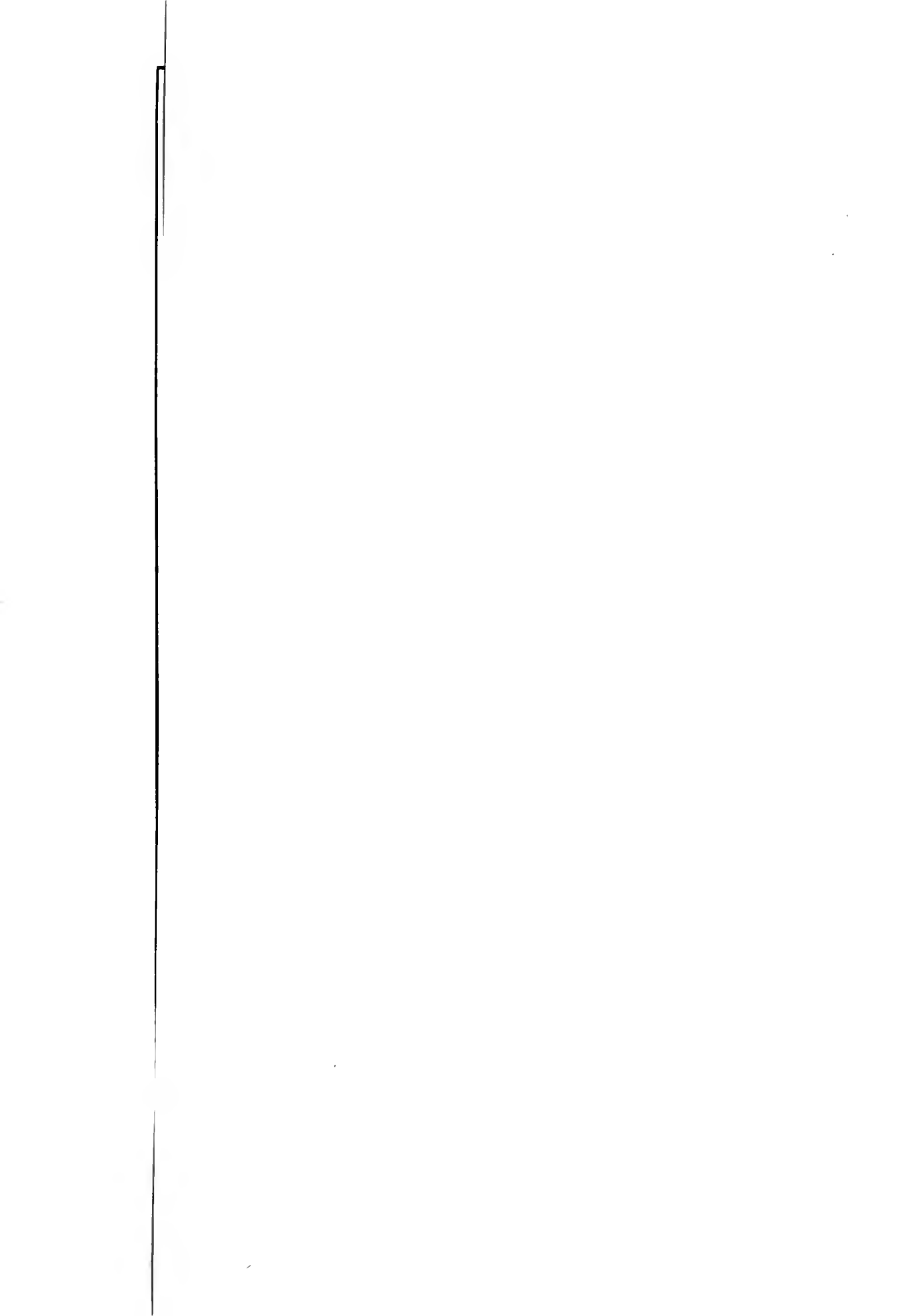
The major differentiations between the routes shown on the plan are (1) the indication of routes that extend directly from the residential sections to the business district; (2) the locations of express bus routes on the proposed Express Highway, and (3) feeder and crosstown busses. One of the main objectives of the ultimate system is the provision of direct service from the residential areas to the downtown shopping centre in all sections of the city. This is one of the greatest conveniences that can be provided for the riding public and should encourage much additional riding on the transit system.

The proposals of the plan are generally self-explanatory and no detailed explanations of each route is necessary. The following is a brief discussion of the major differences between the ultimate and the intermediate system.

1. It is recommended that much of the transit service in the northwestern part of the city be provided by motor bus and that these enter the business district over the Burrard Street bridge. This will also permit the convenient extension of these lines into the University Lands so as to provide direct service between this potential residential development and the downtown district.

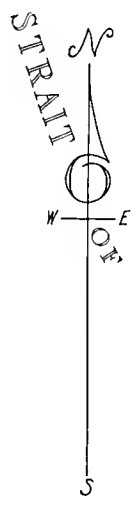
2. A number of routes will enter the central business district via the new Granville Street bridge. This is one of the most logical approaches to the central area. However, the Cambie Street bridge should also be utilized for transit routes.

In connection with the transit service in the area immediately south of the business district reference should be made to the fact that increased freight oper-




VANCOUVER BRITISH COLUMBIA

VANCOUVER
TOWN PLANNING COMMISSION
1 9 4 5



ULTIMATE TRANSIT SYSTEM LEGEND

- TRANSIT ROUTES ENTERING CENTRAL BUSINESS DISTRICT.
- EXPRESS BUS LINES.
- - - EXPRESS BUS LINES GIVING LOCAL SERVICE.
- FEEDER OR CROSS-TOWN BUS LINE
-  AREA MORE THAN 1/4 MILE FROM A TRANSIT ROUTE.

HARLAND BARTHOLOMEW
& ASSOCIATES
TOWN PLANNERS

ONE MILE

EACH DOT
REPRESENTS 50
PERSONS OF THE
FUTURE POPULATION



ation may ultimately force the cessation of interurban or street car service on the Marpole Interurban line. If such service is abandoned, equally convenient service can be provided by establishing a motor bus route on Arbutus Street and extending this over the proposed connection to Burrard Street bridge and then over this bridge to the central business district.

3. One of the most important features of the ultimate plan is the provision for express busses on the Express Highway from Georgia Street in the business district south-easterly through the city and on to New Westminster. These busses could operate on the Express Highway up to such streets as Nanaimo, Rupert and Boundary, and then leave the Express Highway and travel over these major thoroughfares to unload and to pick up passengers. Thus, local service would be combined with express service and the riders would be able to reach the central area quickly and conveniently.

Much study is being given in other cities to the possibility of using these express routes for local transit and the City of Vancouver should take full advantage of this outstanding possibility. About the only change that would be needed in express highway development would be the provision of an extra lane at the major street intersections which would certainly involve a minimum expenditure. There is no other opportunity for providing such excellent service for so little additional cost.

While the Central Park interurban line is shown on the ultimate transit system, this would probably be abandoned after the express bus service has been put into full operation. The Central Park line is too close to the future Express Highway to warrant this duplicate service. The Central Park line can, however, furnish valuable service during the period within which the Express Highway is being completed.

POSSIBILITIES OF RAPID TRANSIT

Reference has been made to the present trend in large cities to provide for rapid transit service. Several cities in both Canada and United States, including Toronto, Detroit, Cleveland and Washington, which do not now have rapid transit systems, are preparing comprehensive plans for the improvement of such facilities. Although Vancouver could not now justify the expenditure for a rapid transit system, it is recommended that the matter be constantly considered by the transit company and by local officials and citizens so that the city may be able to provide such service if it becomes absolutely imperative. The following comments indicate some of the possibilities for a rapid transit service.

The proposed service along the Express Highway serving the southeastern portion of the city would constitute transit service that can and should be made available. This will provide convenient rapid service for a substantial portion of the city area. The service could be even further increased by extending the proposed feeder and local service routes in the eastern portion of the city.

Another possibility for rapid transit is the improvement of the present Marpole line. This would involve substantial track changes, such as the provision of additional tracks for the transit service and the lowering of these tracks so as to eliminate grade crossings with major streets. As previously indicated, the rail-

road operation on this route presents many difficulties, but the potentialities of the private right-of-way should not be overlooked. Feeder busses could be provided to carry passengers from the residential districts to this route.

To provide complete rapid transit service for the Marpole line, it would be essential to construct a subway under Granville Street, probably with a terminus and loop near the present Canadian Pacific Railway station. This would be a costly project, but it would bring a large number of persons to the centre of the downtown district with a minimum of interference and delays.

The above routings are mentioned merely to show the future possibilities. They certainly could not be economically justified in the near future under the present trends of development.

PROPOSED ROUTES IN THE BUSINESS DISTRICT

As indicated in connection with Plate Number 4, the present routes within the central business district are generally satisfactory. The advantages now obtained from this routing should continue in the future, namely, (a) the routes should be as near the centre of the area as possible, and (b) they should extend through the district or at least to the centre of the district (approximately to Pender and Granville Streets). This would insure that passengers can conveniently reach the older portion of the district which will assist in checking any trends of decentralization. Another objective of transit routings in the central area is that both the Burrard and Cambie distributor streets can be kept free of public transit routes and made available for vehicular movement.

The establishment of through routes in the central business district will require from time to time, certain adjustments between the two ends of the routes that form the through line. One of the practical requirements of through routing is that the volume of traffic and riding habits be similar on each end of the line. Since these factors change as new development occurs and the lines are extended, adjustments are frequently necessary. It is especially difficult to determine what the riding characteristics will be of new lines, such as the proposed trolley coaches, and new routes are frequently looped in the business district when first established. Thus no detailed recommendations are made in this report as to the exact routings and connections for all lines in the business centre. Recommendations are made, however, regarding the streets that should be used and the main principles that should be followed.

In the gradual development of the transit system it will undoubtedly prove essential that certain streets be used temporarily for transit facilities but which eventually can be freed of such transit operation. This would be particularly necessary because of probable use of both street car and trolley coach operation. Vancouver's downtown streets are comparatively narrow and there would be many disadvantages if both a centre loading and a curb loading vehicle operated on the same street. Even the loading of one on the near side and the other on the far side of the intersection would still result in restricted movement of automobiles because of narrow pavements. Thus, for example, while Richards Street should eventually be utilized for the routing of trolley coaches, the street car operations may continue for many years and in order to avoid excessive congestion on both Granville and Richards Streets, the first trolley coach routes should operate on Seymour Street, but eventually can be located on Richards Street. Of course, Howe Street—and eventually also Hornby Street—will be the trolley coach routes on streets west of Granville Street.

In general, the following objectives should be adhered to in the transit routing in the central business district under both the Intermediate and Ultimate Plans.

1. Granville and Hastings Streets should carry as many street car lines as will not unduly congest these important business streets. Street cars invariably

carry the largest number of riders and they should be brought to the centre of the district. Furthermore, these streets have long been used for this purpose and should continue as long as street cars operate in the city.

2. Richards Street should continue to have street car operation to avoid congestion on Granville Street, but eventually, it should be used almost completely for trolley coach routings. If trolley coaches should entirely supplant the street car operation they should be located on Granville Street as well as upon the other recommended streets.

3. The trolley coaches that first enter over the Burrard Street Bridge should utilize Burrard Street only as far as Davie Street and then should travel northward to and into the business district on Howe Street. These coaches might be connected with those on the Powell Street line but if they are looped they should travel on Howe to Dunsmuir to Seymour Streets and then on Seymour Street to some street south of Georgia Street which they can use to reach Howe Street. Whenever street car operation is abandoned on Pender Street, any such loop should use Pender rather than Dunsmuir Street, to reach Seymour Street, in order that the coaches may be as near as possible to the centre of the district. The trolley coach line on Davie and Robson Streets should follow the same general routing.

Whenever the trolley coach operation over Burrard Street bridge is supplanted by motor bus route, the busses should follow the above routing in the business district. Eventually as the business district extends westward, the location of the route might be shifted from Howe Street to Hornby Street so as to leave a street exclusively for vehicular movement paralleling Granville Street.

4. The proposed bus line that is to enter the business district over the Georgia Street Viaduct should follow the same general routing as proposed in Number 3 for the trolley coaches. Even if these busses were connected with busses entering over the Burrard Street bridge they should travel northward at least as far as Dunsmuir Street in order to provide service near the centre of the shopping district.

5. The routes in the central business district under the ultimate transit system will be generally similar to those discussed above. The same streets and principle should be utilized. The only major differences will be the express busses which enter the centre over the new Express Highway. These busses operate westward on Georgia Street to either Howe or Hornby Streets and then northward to Dunsmuir or Pender Streets and then extend southward to the Express Highway via Seymour Street. By the time these busses are in operation, it is quite probable that all trolley coach routes will have been removed from Seymour Street to Richards Street and no undue congestion will result.

MISCELLANEOUS RECOMMENDATIONS

It has been indicated that the proposed transit routings are to be gradually carried out during the next 20 to 25 years. The relocations and extensions must be related to new population growth and to other physical improvements proposed in the Town Plan. Many new streets must be opened and improved before some of the proposed routings can be established.

MAJOR STREET IMPROVEMENTS

The character of the street improvement, as well as its location, has a major effect upon the efficiency of the transit system. The pavement must be wide and durable. A curb and a marked line in the centre of the street is especially important for bus and trolley car routes in Vancouver, because of the fog during the winter months. While the ultimate efficiency of the transit system will partly depend upon good street improvements, such improvements are also essential for the large number of automobiles and trucks. The major street improvements that serve both transit facilities and private automobiles should be among the first to be initiated. Another factor that will improve both transit and vehicular movement is the placing of stop signs where minor streets intersect the major route so that the heavier volume of traffic can move freely with a minimum amount of conflict with the cross traffic.

LOADING LANES

Adequate space for loading and unloading passengers using the motor bus and trolley coach must be provided along the curb at the regular stops. Along some of the transit routes in the residential portions of Vancouver there are inadequate pavement and sidewalks. The bus either stops on the narrow pavement, or the passengers step into a ditch. This is both dangerous and inconvenient to the transit riders, as well as to the drivers of vehicles who are forced to wait because of the narrow pavement. The widening and improving of the major streets accommodating transit lines are essential to correct this condition.

In the downtown district adequate space must be reserved for the loading and unloading of passengers at the corners. The few parking places that will be lost by providing spacious zones will be more than compensated for by the convenience to the large number of transit riders. Also, if busses can pull close to the curb there will be less interference with the movement of private automobiles and trucks. Special effort must be made to keep such spaces free of any vehicular parking. As the number of transit vehicles increase it will be desirable and essential to completely prohibit parking along the bus routes during the morning and evening rush hours. This will expedite the movement of both transit and private vehicles.

FARE COLLECTORS

One of the greatest delays to transit movement is encountered in the downtown business district. Here there is more vehicular congestion, and a large number of passengers load and unload at each intersection. Every effort must be made to facilitate this loading and unloading. Expedition has frequently proved possible by having an assistant fare collector stationed at the more important intersections so that riders can load both at the front and at the rear of the vehicle.

LISTED STOPS

Since the passengers desire to travel as quickly as possible to their destinations after once boarding a vehicle, an excessive number of stops must be avoided. The skip-stop system that was installed during the war thoroughly indicated the advantages of this treatment. It should be continued, especially where the intersections are close together. Walking a short distance should be preferable to a longer riding time between the home and destination.

It is particularly important that the most efficient and modern type of vehicle be provided in the post-war period. Passengers will desire both speed and comfort. Much competition can again be expected from automobiles in the post-war period, and operating companies must be able to provide good equipment and sound routes. There is no question about the economy of using transit facilities, and it is largely a question of convenience and comfort. While the Town Plan is not concerned with the matter of fares or operating details it must be reiterated that a good transit system is so important to the development and growth of the city that fare adjustments and operating economies are preferable to an obsolete and inadequate system.

