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Portland-Vancouver Metropolitan Transportation Study. Technical Advisory Committee. Sub-Committee on Public Information

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Solving the

METRO TRAFFIC DILEMMA

Summary of and Supplement to Volume I, Factual Data Report

Published By

the Technical Advisory Committee's
Sub-Committee on Public Information
PORTLAND-VANCOUVER METROPOLITAN TRANSPORTATION STUDY

in co-operation with the

U. S. Department of Commerce
Bureau of Public Roads
THE NEED FOR A MASTER TRANSPORTATION PLAN

A traffic engineer in downtown Portland at 5 p.m. on any weekday could justifiably comment: "Not only the practical but also the possible capacity of these streets is obviously exceeded, and conditions have reached the point of causing unreasonable delay and restriction of driver freedom." An average citizen watching the same rush-hour traffic might sum it up with: "What a mess!"

Both these comments convey the same message, and they apply not only to Portland but to Vancouver and some 13 other neighboring cities. Public officials, business and industrial leaders have been keenly aware that traffic congestion represents a worsening problem. Thus, the Portland-Vancouver Metropolitan Transportation Study was originated to provide a master plan to solve this problem in a way best suited for all agencies involved.

Fortunately, the problem can be solved, and the steps to solution are well underway. The preliminary work has already required extensive effort, time, money, and co-operation from 15 cities, four counties, and two states.

The perplexing transportation situation is basically simple to understand--the highways and streets of the metropolitan area are barely adequate for present-day traffic. Worse yet, they will be alarmingly inadequate in the near future if additional facilities are not provided. Correction of this situation can be made, but it will require not only sufficient funds but also full co-operation of city, county, state, and federal agencies.

The area represented in the study has experienced a considerable growth in both population and vehicle ownership. In a 20-year period (1940-60), the population rose by 63 per cent. During that same time period, vehicle registrations increased by 100 per cent.

Cities involved in this transportation study are Portland, Oregon City, Gresham, Troutdale, Fairview, Tualatin, Lake Oswego, Milwaukie, Gladstone, Beaverton, West Linn, and Tigard, all in Oregon, and Vancouver, Camas, and Washougal in Washington. The four counties are Multnomah, Clackamas, and Washington in Oregon and Clark County in Washington. Co-operating in the study are the Oregon State Highway Department, the Washington Department of Highways, and the U. S. Bureau of Public Roads. Also participating in the study are the Washington Department of Commerce and Economic Development, the Metropolitan Planning Commission, the Port of Portland, and the Oregon Bureau of Municipal Research and Service.
Exhaustive surveys show that the population growth is destined to continue, with vehicle registrations also to follow this pattern. Population growth of the Study Area by 1980 will be about 48 per cent above 1960 figures, or slightly over 1,000,000 persons. The greatest increase will be in Clackamas, Washington, and Clark Counties. The urban portions of Multnomah County will probably grow about 24 per cent, while the remaining portions of the Study Area will grow over 100 per cent. In Multnomah County outside the Portland city limits, population growth will also exceed 100 per cent.

To cope with past population and vehicle increases, the various public agencies have made spasmodic improvements and additions to their highway and street systems. Almost invariably, however, these improvements were made to accommodate existing traffic increases rather than to handle those expected in the near future. These improvements were vitally needed at the time, but the only adequate way to serve the motoring public is with an over-all plan that will provide for systematic handling of both present and future traffic. This will result in considerable savings in money and travel time and will eliminate duplicated efforts. Also, it will not change preferred growth trends.

The start of the Portland-Vancouver Metropolitan Transportation Study was initiated by the cities of Portland and Vancouver to provide a systematic plan for development. The study is financed by the various city, county, state, and federal agencies. Heading the study is the Coordinating Committee, composed of one representative from each county, the city of Portland, the Oregon and Washington state highway departments, cities in each county, the Oregon Bureau of Municipal Research and Service, and the Department of Commerce and Economic Development in Washington. The operational functions of the study were carried out by the Technical Advisory Committee, the members of which represent the participating agencies.
Primary objectives of the P-VMTS were to obtain data and analyze present traffic behavior in order to forecast future transportation and area land use requirements, and to devise a long-range plan of necessary improvements within the study area. To accomplish this, the study was divided into six major phases or steps, similar to those in any transportation study in any major city in the nation. These six phases are organization, data gathering, data evaluation, projecting of future travel, development of future plans, and adoption and implementation of a plan.

The completed work of the transportation study will result in three major volumes, with several specialized reports. The first volume is the Factual Data Report, which presents data describing traffic conditions and patterns on an average weekday in 1960 and identifies the current trends and the factors which best indicate these trends. Volume Two will cover the analysis of the traffic data and development of future demands for which the transportation plan, designed to fit the social and economic development of the area, will be planned. Volume Three will present the planned system.

This report will briefly touch on these volumes, but anyone wishing a thorough knowledge of the Transportation Study should read the individual volumes. They provide all necessary technical data of the study.

One of the early steps in the development of the study was to compile inventories of the streets, travel times, traffic volumes, capacities of the intersections and an accident survey. A major street network was first determined containing all streets used as collectors, arterials, expressways and freeways. With the help of the participating agencies, this network was determined and used as the basis on which the existing analyses were made. The study area covers approximately 440 square miles, and within this area the major street network includes 1,109 miles, of which 1,041 miles are arterial and collector streets, 48 miles are freeways, and 20 miles are ramps.
One of the findings of the study was that in 1960 the Study Area had 34,697 accidents. This represents a monetary loss of approximately $30,000,000. Forty intersections in the Study Area had 30 or more accidents during the data-gathering year. More than 60 per cent of all accidents in the city of Portland occurred at intersections. In addition, 68 per cent of all fatal accidents and 71 per cent of all injury accidents occurred at intersections.

Part of the study on existing travel facilities was devoted to mass transit. As expected, it was learned that use of mass transit is declining despite the continued increase in general traffic. Twenty-one per cent of mass-transit trips were oriented to the Central Business District of Portland, but these represent only 18 per cent of the total person trips to the Central Business District. Thirty-five per cent of all mass-transit trips within the Study Area are school-oriented.

The Lloyd Center in Portland opened shortly after completion of the O-D Survey. This establishment, which boasts of being the largest shopping center in the world, attracted traffic of such magnitude that it was decided to conduct a Lloyd Center Supplemental Survey. This data, compiled from 2,000 interviews, was merged into the trip projections for 1980.

All the information obtained in the O-D Survey was handled on a strictly confidential basis, and upon completion of coding the data, all possible identifications of the households or vehicles were destroyed. The reasons for this are obvious, for it would have been impossible to conduct these thousands of interviews without involving a goodly share of humor, personal interests, and sometimes undertones of tragedy.

To obtain a clear picture of both present and future traffic, it was vital to have an accurate survey of land use in the study area. Land use refers to the type of activity which occurs on any given parcel of land, ranging from residential to industrial.
The use of land within an urban area determines the magnitude, location and type of transportation system needed to serve the area. Conversely, the transportation system may also dictate to some extent the land use. Rail freight terminals, for example, tend to attract industrial use of land.

The survey of land use in the Portland-Vancouver Metropolitan Study Area was benefited by several comprehensive studies and surveys which had been recently completed by the Metropolitan Planning Commission, the Clark County-Vancouver Regional Planning Commission, and the U. S. Bureau of Census. These studies provided the basis for correlating trip data with land use and were valuable in forecasting future land use.

Some types of land use produce trips, and other types attract trips. For instance, residential land use produces trips that are attracted to industrial land or commercial land, as when a man leaves home to go to work or when a woman leaves to go shopping.

GROWTH OF STUDY AREA

Predicting future transportation needs for a particular year may appear to be the solution for transportation planning. However, these needs do not suddenly occur just at that year. They are a result of a gradual, general increase and thus, while it is advantageous to know what the goal should be at the target year, it is also necessary to plan step-by-step improvements leading to that target year and beyond. These improvements must not only solve immediate crises but must be within the framework of the over-all transportation master plan.

The over-all plan is not merely an expansion of existing traffic patterns but takes into account anticipated residential growth, industrial growth, recreational growth, and other related developments of the area. To a sizeable extent, the transportation plan will affect these growths, but there are other factors that control these growths. For example, availability of sewer and water service, topography, geology of the land, and prices affect and control residential expansion. Thus it is necessary to include as much information as possible, which will allow the planner to develop his system comprehensively.

Major transportation facilities play a significant role in the growth of an area; in fact, a less desirable location of a major facility may so influence the development that, after a period of years, it may appear to have been placed in the proper location after all. For reasons such as this, the economic and social effects, not only to the user but to the whole community including the non-user, must be anticipated and if possible be quantified before making the final location of a major facility.
Studies have been previously made which reliably forecast growth in the metropolitan area to 1975. These have been used and adjusted to 1980. These study reports include Economic Prospects, prepared in 1957 by the Portland City Planning Commission; Population Prospects, prepared in 1960 by the Metropolitan Planning Commission; Land for Industry, prepared in 1960 by the Metropolitan Planning Commission; and Recreation Outlook, prepared in 1962 by the Metropolitan Planning Commission.

From these, and by studying present trends, policies, land use plans, and political implications, future land use in major categories was developed. These major categories are: Residential, Manufacturing and Wholesale, Non-Manufacturing, Commercial & Services, and Public Buildings & Open Space.

Population growth of the Study Area will be about 48% above 1960 or slightly over 1,000,000 persons, with the greatest increase to be found in Clackamas, Washington, and Clark Counties. The urban portions of Multnomah County will probably grow about 24% while the remaining portions of the area will grow over 100%. In Multnomah County, outside the city of Portland, population growth will also exceed 100%.
Active industrial land uses (manufacturing & wholesale, and non-manufacturing) are anticipated to increase about 60% above 1960, and employment in industrial occupations about 50%, although the demand for industrial land for further expansion will be significantly greater than that placed in actual use.

Employment in all fields will increase 36% in the next 20 years, with the biggest increase expected in regional service industries. This is based upon Portland’s present position as an important regional center for supplying goods and services. Of course, the water-level route through the Cascades, low-cost electric power, ocean-going shipping, coupled with timber and agricultural resources, support a significant though minor portion of employees in manufacturing occupations.

THE WORK OF COMPUTERS

The comprehensiveness of the Portland-Vancouver Metropolitan Transportation Study was made possible by the reliability and accurateness of the high-speed electronic computer of the modern age. These computers can relate factors not only regarding traffic but social and economic planning. They can develop prediction equations using multiple numbers of variables. They enabled the study team to accomplish in minutes what a staff of technicians could not do in a year.
For the purpose of the transportation study, the four-county area was divided into 297 "zones" or geographic areas. These were defined on the computer along with the major street network over which traffic could travel from zone to zone. The computer is able to analyze literally thousands of traffic routing opportunities between every pair of zones and then select the optimum routes, or the most desirable one in relation to time required for a vehicle to travel the route.

To develop these minimum time paths, literally millions of decisions must be made by the computer, tracing by trial and error over any or all of the 3,350 links on the system. The speed of the computer can be realized when you consider that within the Study Area all minimum paths from one zone to the remaining 296 zones can be identified in one and one-half seconds.
As a first step in estimating future travel (trip making), the present trip pattern is analyzed in terms of trips produced or attracted by the various uses of the land. Most trips are made by residents and the number they make is related to the circumstances in which they live. Factors such as residential density, family income, number of persons per family and automobile ownership per family determine the number of trips that each residence produces. Equations are developed (by regression analysis) which relate the above social and economic factors to the daily number and type of trips made by households.

It is then a matter of predicting the future characteristics of any unit area in terms of the above factors and applying the equations to predict the number of trips which will be made in the future. Each trip developed or produced at the residence must have a reason for its being; in other words, it is attracted somewhere, such as place of employment, shopping center, bowling alley, or even another residence. The activity of these attractors can be used as a means of measuring trips attracted to them. By comparing the prediction of total trips attracted in 1980 for each unit area with known total trips attracted in 1960, the growth factor is determined for each unit area or "zone."

Once these growth factors have been computed for each zone, it is possible by mathematical means, using the high-speed computer, to predict the actual zone-to-zone movements anticipated between every combination of zones in the area. Once these movements have been predicted, trips are then assigned to the network by using the same assignment techniques as originally used when assigning existing traffic to the system; that is, every movement between zones is assigned along the minimum time path found by the high-speed computer through the network of the system.

In Multnomah County, trip growth is anticipated to be 48%, or about twice the population growth, while in Clackamas County it is 111%, in Washington County 157%, and in Clark County 124%, or about 25% above the population growth in these three counties.

The predictions also show that in 1980 the Portland Central Business District will remain the prime area attractor for trips. However, localized movements throughout the suburban areas will build up at a much more rapid pace, indicating a tendency for suburban dwellers to do most of their additional trip making away from the CBD. In all, almost 3,000,000 person trips will occur in the study area in 1980, compared to 1,768,000 in 1960.

Armed with 1980 anticipated movements between zones, and a basic network on which these movements can travel, it is then possible to update the network (road system) in any manner desired to reflect proposed improvements and test these improvements for their ability to handle anticipated traffic. Minor changes, as well as major ones, can thus be investigated if desired.
Any proposed system must be evaluated in more ways than its ability to handle traffic. For the road user, the relationship of his costs for the improvement compared with the benefits received must be quantified. The effects upon the community (socially, economically, and esthetically) must be considered.

Experience has demonstrated that piecemeal improvement efforts are not the answer. Cities in the past have failed too often to plan comprehensively to meet their transportation needs. There are two main reasons for this. One was the lack of funds for extensive capital improvements. The other was lack of essential facts.

Fiscal limitations are now being eased, at least in part, by the vastly increased federal aid for urban areas. As for the factual handicap, this is being overcome by the work of the Portland-Vancouver Metropolitan Transportation Study.
Few persons can deny that urban highway modernization has lagged dangerously while vehicular volumes continue to grow at record-breaking tempos. Traffic paralysis is inevitable without a comprehensive plan such as the one being developed by the agencies involved in the present study.

This is not just a problem in our area of the Pacific Northwest. It is in evidence throughout the nation. The dollar-conscious persons might be interested in knowing that $680,000,000 is now being spent annually for transportation research. Of this total, $20,000,000 is being spent specifically on problems of highway planning and design.

The rapid rise in traffic congestion and the increasing loss of property and life from accidents has made it necessary for such studies as the one for the Portland-Vancouver area. Much of this congestion will be alleviated when the Portland-area Interstate freeway system is completed. Sections of this are being opened each season, but still to be settled is the location of Interstate 205 on Portland's eastside. The Portland-Vancouver Metropolitan Transportation Study will include a recommendation for this route, a recommendation that will come following a most exhaustive study to determine the best location for all persons and agencies involved.

Besides the freeway additions, other improvements are also necessary to local roads and streets, if the over-all plan is to reach the optimum performance possible.

Time, which traditionally waits for no man, or public agency either, is a major factor in the present traffic congestion. A considerable amount of this time was consumed in obtaining the findings of the study. The solution to the traffic congestion problem is nearly ready to present, but this problem will continue to worsen if adoption is not immediate.
NOW...

IS THE TIME
TO PLAN
FOR THE FUTURE