

I-5 Corridor Project

9/15

Need Gibby, CRAC, proposed in review the signal at INTERSTATE and going to be fully actuated with sensors on the freeway, off ramps to favor green time on going when ~~green~~ green threatens to extend onto freeway - To provide for pedestrian push button override and to include a bus preemption capability. Maximum cost \$25-30000 but probably much less as most of installation is in place.

POSSIBLE FUNDING

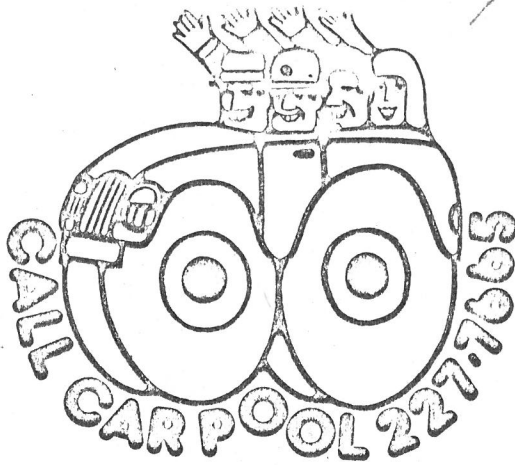
100% - STATE BONDS

78% Fed - FAP EXTENSION

78% Fed - FAV

92% Fed - Interstate.

Coordinate with Going ST Project



September 18, 1974

Pierre Hendrickson
Washington Highway Department
4200 Main
Vancouver, Washington 98663

Dear Pierre:

Attached is a proposal for a cooperative effort between the Washington Highway Department and the Portland Metropolitan Area Carpool Project to promote carpooling among Clark County commuters.

As you know the Portland Carpool Project is funded by FHWA Carpool Demonstration Project funds which cannot be expended within Clark County. However, we are proposing that our attention be centered upon Clark County residents who commute to jobs in the Portland area. This group affects gasoline consumption, traffic problems and pollution both in the Portland area and in Clark County. Consequently, we feel justified in participating jointly with the Washington Highway Department in sponsoring this special effort.

The attached proposal outlines the activities, responsibilities and expenditure limitations of the Washington Highway Department and the Portland Carpool Project in this joint venture.

If this proposal is acceptable to you we will proceed with implementation on this basis. Otherwise, we will wait until all major issues are resolved prior to implementation.

Very truly yours,

Jack Graham
Project Manager

JG/br

cc + enc: Dennis Moore
Hurvie Davis ✓
Bill Dirker
Fred Klaboe
George Baldwin

CARPOOL PROMOTION AMONG

CLARK COUNTY TO TRI-COUNTY AREA COMMUTERS

PROPOSED WORK PLAN

It has been proposed that the Portland Metropolitan Area Carpool Project assume responsibility for promoting carpooling among Clark County, Washington, residents who commute to jobs in Washington, Clackamas or Multnomah Counties in Oregon (Tri-County Area). The density of traffic flow over the Interstate Bridge and on Interstate 5 connecting Clark County with the Tri-County Area could be reduced by an increase in the load factor of private automobiles to the benefit of Clark County and the Tri-County Area.

In order to pursue this objective within the regulations effecting the FHWA carpool demonstration grant to the Oregon Highway Division for the Tri-County Area the following work plan is proposed as a means of dividing responsibilities and expenditures between the Portland Carpool Project and the Washington Highway Department.

I. The Portland Metropolitan Area Carpool Project should assume responsibility for the activities described below:

A. Park and Ride Lots

(1) Negotiations of parking lot use agreements within Clark County. Objective would be to obtain authority for use of at least five lots along the I-5 corridor in Clark County at no cost for the use or improvements of any such facilities. CARPOOL staff would be available for the purpose of locating lots and negotiation of use agreements.

CARPOOL would not be a party to the contracts. The contracting parties would be the lot owner and Clark County, Vancouver, or Washington Highway Department or simply an informal commitment by lot owner to make the lot available for use as a park and ride lot for carpoolers.

(2) CARPOOL would design and manage the promotional or informational campaigns regarding the availability of park and ride lots. The design of such promotional activities would be done with the concurrence of Washington Highway Department and the Columbia Region Association of Governments' (CRAG) I-5 Corridor Advisory Board.

B. Matching Effort

(1) Matching capability will be provided by CARPOOL through access to its computerized matching system. All materials including data sheets and instructions will be provided by CARPOOL.

A toll free telephone line from Clark County to CARPOOL will be provided by CARPOOL.

(2) CARPOOL staff will design and distribute matching and promotional materials directly to Tri-County Area employers for distribution to Clark County residents employed by those companies.

C. Expenditures

(1) Expenses incurred in conjunction with the specific activities described in A and B above will be borne by CARPOOL.

II. The Washington Highway Department should assume responsibility for the activities described below:

A. Park and Ride Lots

(1) Act as a contracting party for the lease of parking lots for use as park and ride stations if a formal contract is required and unless another agency listed in I. A. (1) above becomes the contracting party.

(2) Provide and install identification signs on park and ride lots. Provide striping of park and ride lots as required with agreement of lot owner. Participate in design of promotion of park and ride lots.

B. Matching Effort

(1) Participate in design of carpool promotional effort.

C. Expenditures

Subject to a maximum total expenditure limitation of \$1,000.00 for the activities described above in Parts I and II of this proposal and limited to the period beginning September 1, 1974, and ending December 31, 1974, the following expenses would be borne by the Washington Highway Department:

(1) All expenses incurred in signing and striping of park and ride lots.

(2) All expenses incurred in the purchase of billboard or newspaper space and air time on radio or television as specifically agreed upon in advance by CARPOOL, the CRAG I-5 Advisory Board and Washington Highway Department consistent with this proposal.

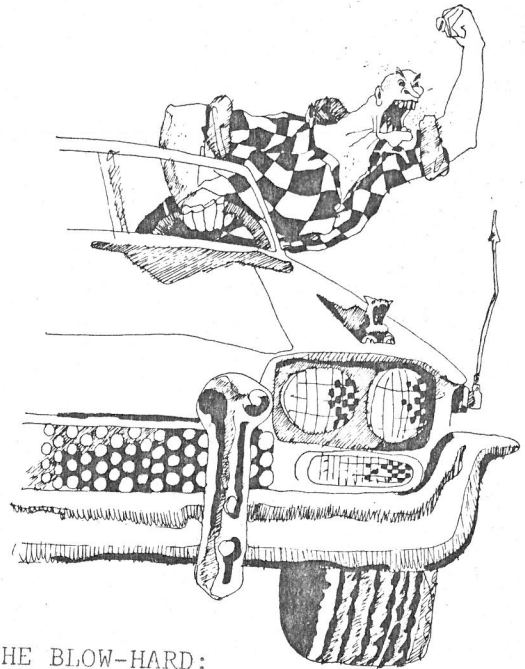


When it comes to dealing with a problem, there seems to be three kinds of people.



THE HELPLESS:

This guy is a lamb. Oh, he might bleat in self-pity but he just follows the flock and waits to be clipped.



THE BLOW-HARD:

This fellow may snort like a bull, but he's really a bum steer. He stomps around and makes a lot of noise, but he just isn't cut for action.



THE SAVVY:

This man has horse sense and puts it to use. When problems crop up, he takes action - and makes his own solutions.

You can find all three types every morning on the Interstate Bridge.
(over)

Currently there are 11,485 persons making the daily trip from Vancouver to Portland in 9,212 cars with an average occupancy of 1.24 people per car. This means that too many people are driving alone and paying dearly for this traditional form of transportation. Each individual commuter is spending a conservative \$747 each year to drive alone. This is based upon an average roundtrip of 18 miles a day, times 22 working days a month, times 12 months, at 15.7¢ a mile. This 15.7¢ a mile includes gas, oil, tires, maintenance, insurance, and depreciation. If you pay to park your car, add \$264 to your yearly total.

Here is what you would pay if you had a carpool:

1 person per car:	Save: \$ -0-	Pay: \$747.00
2 people per car:	Save: \$373.50	Pay: \$373.50
3 people per car:	Save: \$498.00	Pay: \$249.00
4 people per car:	Save: \$562.25	Pay: \$186.75
5 people per car:	Save: \$597.60	Pay: \$149.40

So, if you joined or formed a five-person carpool, you would be giving yourself a \$50 a month raise! Think of what you could do with that extra \$600. It could pay for your vacation next year.

If we could get the average occupancy of each car from Clark County to 2.0 people per car (as opposed to the present 1.24), then there would be 3,470 fewer cars on the Interstate corridor each day. This would be equal to removing a line of bumper-to-bumper cars 13.1 miles long! Think of that the next time you're jammed up on the freeway coming to work or going home. Also, these 3,470 fewer cars would save each year: 16 million highway miles, over 2 1/2 million dollars in commuting costs, and over one million gallons of gasoline. The ecological benefits would be as equally impressive. The average car emits 145.9 pounds of pollutants for each 1,000 miles driven. This total includes organic gases such as hydrocarbons, particulates and inorganic gases such as carbon monoxide. Auto emissions would be reduced by 1,206 tons!

So how do you get into a carpool? Check with your fellow workers or with your employer. Over 150 companies have a carpool program. If you don't have any luck there, simply call C-A-R-P-O-O-L (227-7665) or toll free from Vancouver 696-9238 and they will be glad to help you. Their service is free of charge.

THE ZONE COMPOSITION

The I-5 Corridor Project zone composition used the 46 super zones as a basis. Near the corridor the superzones were divided in order to provide better detail. Superzone number 1 was divided by the Willamette River thereby creating one additional zone. Zone 7 was divided by I-5 again adding another zone while 9 was separated into three zones by I-5 and the North Portland Harbor. In Clark County the freeway divided zones 39 and 45 into halves. In contrast the super zones were ~~rated~~ ^{combination} in Washington, Clackamas and East Multnomah Counties in order to reduce the manual computational effort. The total number of zones was 28. The intent in this activity was to provide detailed information where needed, ^{namely} in the corridor, and gross information where detail was not needed.

TRIP GENERATION FOR PORTLAND ZONES

Since no O-D data concerning trip generated from the North Portland superzones was available, it was necessary to predict the tripmaking behavior of the residents of this area on the basis of behavior observed in the O-D survey.

Generation factors were computed on the basis of the attraction zones on the Portland side of the river. This factor was computed by dividing the total number of attractions by total 1973 employment. These attraction factors were grouped into four categories based on the amount of land use in each zone dedicated to commercial and industrial uses. These zones included:

1. High Density (600 acres or 20% or more commercial-industrial use).
2. Medium Density (200 acres or 10% or more commercial-industrial uses).
3. Low Density (less than 10% or 200 acres commercial-industrial uses).
4. Suburban - the three composite zones located in Washington, Clackamas and East Multnomah Counties.

A mean generation factor was computed for each category. The portion of a zone's work* attracted to a given destination zone (P_i) was computed by multiplying the work force by the attraction factor assigned to the given zone.

This data, combined with zone to zone distances was used in the Electrostatic model to compute the predicted number of work trips from T_i to T_j .

*Work force equals $.41 \times \text{population}$ (based on $\frac{\text{work force}}{\text{population}}$ for the entire metropolitan area.)

The 1973 Base Year Population & Employment

Since the project's origin-destination survey was conducted in late 1973, it was decided to use 1973 as the base year for preparation of data on future travel demand in the corridor. As detailed population and employment data are not available for 1973, it proved necessary to expand upon 1970 census data to obtain 1973 estimates.

Two methods of estimating 1973 population and employment were considered. First, the 1970-73 increase in metropolitan area employment and population was determined from state employment division figures. The increase in population and employment was then allocated to each superzone, on the basis of the superzones share of the total metropolitan area population. This method, however, tended to allocate relatively large increases to densely populated superzones in older areas of the city of Portland where experience suggests that population growth has leveled off.

A second procedure was developed where 1990 population forecasts were obtained from data developed by the Governor's Task Force. The population and employment increases for each superzone were determined by subtracting the 1990 forecasts from the 1970 census data. The remainder was multiplied by .15 to reflect the 1970-73 increase. While this "straightline technique" provided a more conservative total population estimate for the region, it appeared that this technique produced population and employment data which more accurately reflected existing conditions, while remaining relatively simple to manually compute.

Subsequently, the later method was used to establish the base year population and employment data.

TRIP DISTRIBUTION

For the trip distribution step in the Transportation Planning Process three mathematical models were considered; namely, the intervening opportunity, gravity and electrostatic. The later model was found to be relatively simple for manual computations and yet contained a parameter which reflected the "accessibility" between zones.

The electrostatic model estimates demand as a function the following parameters: zone productions, zone attractions, equation is defined as follows:

$$T_{ij} = \frac{A_j}{S_{ij}} \times P_i$$

Where: T_{ij} = total number of trips from i to j
 A_j = total number at attractions at j
 S_{ij} = distance or trip time from i to j
 P_i = total origins at i

This model was tested in two manners. First, straight line distance (in feet) was computed from i to j and divided by 1,000. This figure was then used in the model as S_{ij} with trip production and attraction data developed from the projects origin-destination survey. A second method of computing S_{ij} was developed which utilized travel time from i to j measured in minutes.

The former method of computing S_{ij} was found to be slightly more accurate in two test zones. Accuracy was measured by plotting the estimated values against actual values and determining the linear regression coefficient.

The values produced by the model were tested against actual values obtained through the O-D survey. Tests of significance were made through the Chi-square Test. Since estimated and actual values were so large, the test was made on the basis of the percentage of trips that each T_{ij} represented from the entire zone. They were calculated

as follows:

$$\frac{T_{ij}}{\bar{T}_{ij}} \times 100 - \% T_{ij}$$

Significance (at 5% level) was observed in only 4 of ten zones. These four zones however, contain 65% of the total Clark County trip origins. The tables showing the actual and computed values for each zone are attached.

THE TRANSPORTATION NETWORK

Network Coding

The intent of building the existing transportation network for the I-5 Corridor Project was to provide an abbreviated regional network but with adequate detail in the corridor.

The network consisted of the I-5, the major arterials, Union, Vancouver, Interstate and Greeley Avenues, within the corridor and those arterials which intersect the freeway and/or arterials in the corridor both in Washington as well as in Oregon. These facilities include 78th Street, 39th Street, Fourth Plain Blvd, Mill Plain Blvd and Lewis & Clark (SR14) in Washington. In Oregon Swift St. Columbia Blvd., Lombard St., Portland Blvd., Killingsworth Street, Going Street, Fremont Street and Broadway Ave are included. In addition, sufficient major freeways and highways in the region were included so that each zone had access to all other zones in the region.

Based on the 1973 Base Year Trip Table assignments were loaded on the existing network and checks were made at several locations against field counts which were very close to each other.

1980 NETWORK ALTERNATIVES

The design year (1980) transportation network alternatives will consist of various combination of existing facilities, several transit options (exclusive roadway, exclusive lane, in mixed traffic with ramp metering), light rail and waterways. More specifically, there are four basis alternatives.

- I. Existing facilities plus buses on exclusive transitway on I-5.
- II. Existing plus light rail on exclusive railway facilities.
- III. Existing plus buses on exclusive lane on I-5.
- IV. Existing plus buses in mixed traffic with ramp metering and

waterway passenger route between Vancouver and Portland CBDs.

In addition, following the assignments some work will be performed to evaluate which route - Interstate Avenue, I-5 or Union Avenue - is most desirable for an exclusive facility.

MODAL SPLIT

The DCCO curves of the 1990 Public Transportation Plan will be used to provide the modal split. The variables which determine the modal split value will include the following: travel time ratio (transit/highway), cost ratio (transit/auto), employment density and income. The first variable is the only one which has continuous values; the others are incremental in nature. As an example, each person will be in only one of three categories.

The application of modal split will follow the trip interchange approach so that the modes will "complete" for the distributed trips. The network loading and modal split will occur simultaneously in increments so that the travel time parameter of the modal split process may be changed to reflect congestion as the network is loaded. There will be some sensitivity effort put into determining how such things as parking and fuel costs will affect the modal split.

The network assignment loading process will include a restraining procedure in order to better simulate the reality of the corridor transportation system. The method of applying the restraining procedure is iterative in that the trips are to be assigned to the network incrementally to permit travel time adjustments as the assigned volumes approach capacity. More specifically the assignment will occur in the following portions of the total trips: .40, .30,

.20 and .10. After each fractional assignment, the first being .40, the assigned trips will be factored to 100% and tested against the link capacities. Those links, which exceed or approach capacity will have their travel times increased to reflect the congestion. This adjustment in travel time will enable some trips to L. use another facility 2. use another mode or 3. modify travel distribution. Subsequent loadings will provide modifications on each iteration until equilibrium on the network is obtained.

September 10, 1974

Mr. Robert Bothman, Metro Engineer
Oregon State Highway Division
5821 N.E. Glisan Street
Portland, Oregon 97213

Subject: Signing at Delta Park Interchange

Dear Mr. Bothman:

Enclosed is a request from Hurvie Davis, Assistant Director of Transportation, CEAG, for the installation of a sign at the I-5 Off-Ramp and N. Victory Boulevard.

We have checked this during the P.M. peak (memo enclosed) and have no objection to this request. Since the traffic control at this intersection is under State jurisdiction we are forwarding this request to you.

Sincerely,

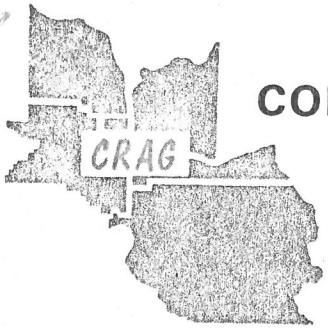
D. E. BERGSTROM
Traffic Engineer

RCS:ba
Encls.

cc: Hurvie Davis - CRAG
Ma. Dirker - City Planning

RECEIVED
SEP 12 1974

City of Portland
Bureau of Planning



COLUMBIA REGION ASSOCIATION of GOVERNMENTS

6400 S. W. CANYON COURT
PORTLAND, OREGON 97221

(503) 297-3726

M-E-M-O-R-A-N-D-U-M

CLACKAMAS COUNTY

Canby
Gladstone
Happy Valley
Lake Oswego
Milwaukie
Oregon City
West Linn

CLARK COUNTY

Camas
Vancouver
Washougal

COLUMBIA COUNTY

Clatskanie
Columbia City
Prescott
Rainier
Scappoose
St. Helens
Vernonia

MULTNOMAH COUNTY

Fairview
Gresham
Portland
Troutdale
Wood Village

WASHINGTON COUNTY

Beaverton
Cornelius
Durham
Forest Grove
Hillsboro
North Plains
Sherwood
Tigard
Tualatin

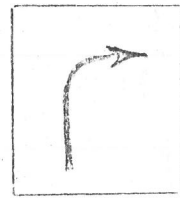
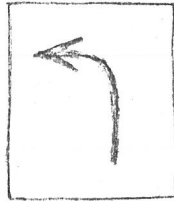
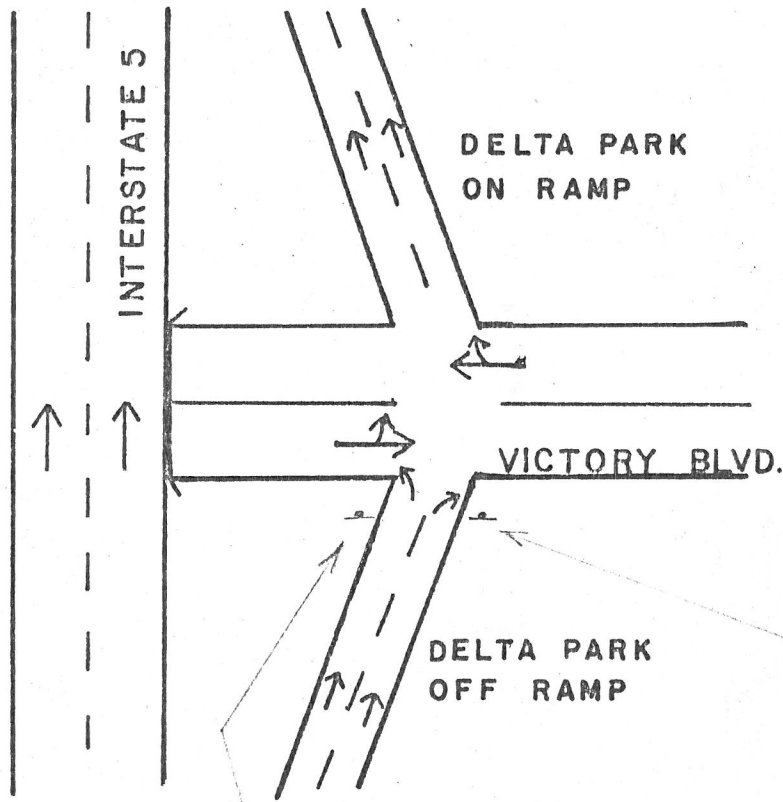
To: Don Bergstorm, City of Portland Traffic Engineer
From: *Hurvie Davis*
Hurvie Davis, Assistant Director of Transportation
Subject: Signing Proposal at Delta Park Interchange

Level of service "F" usually prevails during the evening peak period northbound on I-5 in the vicinity of the Delta Park Interchange and extends a considerable distance to the south. Traffic exiting I-5 on the northbound off-ramp (see attached sketch) proceeding straight through the intersection with Victory Blvd. and entering the freeway from the on-ramp can reduce the travel time about 3 to 5 minutes per vehicle. For passenger cars this saving is very small and we do not recommend it, but for buses, near capacity, there would be a time saving in excess of 3 person hours/bus. Since buses proceeding straight through the intersection is presently illegal, the Management Board for Interstate Bridge Corridor Project has recommended that one of the lane use control signs have a plaque installed with "Except Buses" or a similiar message.

Your earliest favorable action on this request for a low cost improvement is appreciated.

c.c. Bob Cunningham, ODOT
William Dirker, City of Portland

EAST DELTA PARK INTERCHANGE



EXCEPT
RULING

PROPOSED
PLAQUE

NATIONAL TRANSPORTATION ENERGY CONSERVATION ACTION PLAN

DEMONSTRATION GRANT APPLICATION

PRIORITY TREATMENT FOR HIGH OCCUPANCY VEHICLES

FAI-5

MAIN STREET (VANCOUVER) TO BROADWAY (PORTLAND)

Revised
September 5, 1974

Columbia Region Association of Governments

In Cooperation With
Oregon Department of Transportation
Washington State Department of Highways
Other Local, State and Federal Public Agencies
and Private Organizations

T A B L E O F C O N T E N T S

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INTRODUCTION

In January of 1974, Congress enacted legislation which was set up in order to address the existing fuel shortage. Because the world supply of petroleum is limited and is expected to be exhausted by the year 2050 and the cost of obtaining the remaining petroleum will increase substantially, it is imperative that this fuel be conserved. Also, since fuel is being consumed at an increasing rate, time is of the essence. This Federal legislation provides a procedure whereby fuel saving transportation improvements may be implemented in a very short time. In particular, this legislative action plan encourages immediate and short range improvements. Oregon and Washington have for years been concerned with conservation of natural resources and likewise are concerned with the fuel shortage and conservation of this fuel supply.

This demonstration proposal is only one element of a system solution being developed for the Interstate Bridge Corridor Project. This Project was established to move people in the corridor more efficiently with minimal environmental damage and this demonstration project is intended to meet this criteria as well as to conserve fuel. There will be basically two parts in this demonstration project. The first is preliminary engineering which will explore the possibility of providing priority treatment for high occupancy vehicles (HOV) either by a concurrent flow priority lane or ramp metering with HOV by pass. The second part consists of the implementation of the alternative selected from part one.

Any improvements in this corridor will also consider the impending reconstruction and modification of Interstate Route 5 in Vancouver and North Portland. It is anticipated that the Washington State Highway Department will begin their work early in 1975 and complete it within five or six years. The work in Oregon will be safety improvements and is expected to begin in the spring of 1975. Since major reconstruction is planned in Washington, this demonstration project is proposed primarily for the Oregon section of the freeway and this work should be integrated into the safety improvements work planned in Oregon.

THE SCOPE OF THE PROBLEM

Urban freeways generally have a problem of excessive traffic demands during the peak periods. These excessive demands result in travel time losses, air pollution and accidents. The problem on Interstate Route 5 is compounded or intensified when, occasionally, the draw Interstate bridge open during or near the peak periods. This bridge is the only transportation link from Vancouver to Portland in the metropolitan area.

A substantial portion of the Clark County work force, more than 12,000, is employed in the State of Oregon and must cross the Interstate bridge each working day. It should be further noted that Clark County is one of the fastest growing counties in the Northwest; therefore, one may expect an increase, at least in the near future, of persons commuting to Oregon for work purposes.

To address these points, a minimum of two types of priority treatment for use by HOV will be evaluated in the corridor:

1. Concurrent-flow in an exclusive lane.
2. Ramp metering with HOV bypass.

OBJECTIVES

The major objective of this project is to provide immediate conservation of energy. Along with this major objective, other objectives consist of providing incentives to increase the use of buses and car pools and increase the person movement capacity of Interstate Route 5 at a reduced level of fuel consumption. It is expected that congestion and associated problems will be reduced by improving the traffic flow on this facility through the installation of HOV priority treatment measures.

PROJECT DESCRIPTION

The project study area includes that part of the Interstate Route 5 highway facility between Vancouver and Portland, bounded generally by Broadway (Portland) on the south and Main Street (Vancouver) on the north. The actual limits of project implementation may depend on the results of the preliminary engineering phase (Part I).

The priority lane treatment designates one lane for the use of HOV during the commute periods. This lane will be used exclusively for HOV identified as buses and car pools with possibly three or more persons. The concurrent-flow priority lane could consist of restriping the facility in the project area so as to accommodate one additional lane for the exclusive use of buses and car pools during the peak periods. Ramp metering would install control devices at selective on ramps to reduce the freeway demand so that reasonable operating speeds can be maintained. HOV will be permitted to bypass the control devices.

Basic traffic control devices will be necessary for the priority lane and will include such items as changeable message signs, lane use signals, manual installation of traffic cones, entrance and exit gates at the termini of the priority lane, towing service and additional policing. The ramp metering measures will include traffic signals, signs, informational signs on adjacent arterials, pavement markings and additional policing.

The project also includes public and/or private parking lots which may be located near 78th Street, Mill Plain Boulevard or Fourth Plain Boulevard interchanges and corridors. The private parking lots may consist of shopping centers or individual businesses which have large parking areas and at which owners agree to such use. These parking lots will be properly signed so that perspective riders of transit or car pools may readily locate them. In addition, on public property it may be necessary to provide minor surfacing improvements to accommodate the vehicles. The size of these lots are expected to be sufficient for 20 to 100 vehicles.

WORK PROGRAM

The work program for this demonstration project consists of two parts with four elements in the second part.

The first part is preliminary engineering which is to be conducted by the staffs of the state highway departments. The reason for using the state highway departments is because time is of the essence and these agencies already have the needed expertise. The administrative requirements to retain and hire a consultant would take a considerable amount of time. The preliminary engineering consists of analysis, determination and design for the operation of the best alternative. Part I also includes the preparation and advertising of the contract plans.

The first element of Part II consists of the preparation of contracts and installation of the traffic control devices, parking lots and provision of proper inspection and contract administration to effectively and thoroughly provide for the installation of those devices and other improvements.

Marketing programs, the second element, will develop and provide incentives for people to car pool and use transit. This program will interface with the regional car pooling effort to provide special attraction and add emphasis to car pooling in the Interstate Corridor.

The third element, the operation of the priority treatment is to be directed by the state highway agencies. The law enforcement agencies will provide the policing and a franchise for the towing service will be required if the priority lane is implemented. This element will be monitored very closely in terms of safety, volumes, speeds, etc. Monitoring records will provide a good data base for the final elements of the work program.

The fourth element, project evaluation, will determine the performance of the project and its usefulness as may apply to other corridors in this or other regions. The evaluation will also recommend whether the project should be continued or terminated at the end of the demonstration. If the project is successful, it could be continued until the rebuilding of Interstate Route 5 is completed, at which time the new facility may have been designed and constructed to accommodate the need for this high occupancy priority treatment.

FINANCING

As with any improvements there are two aspects to financing; namely 1) the expected costs, and 2) anticipated revenue. The estimated costs are divided into two parts. Part I consists of analysis and preliminary engineering, and Part II is implementation. The Part II costs may vary somewhat from the stated values pending the outcome of the work from Part I.

Part I	Analysis and Preliminary Engineering	\$ 50,000
Part II	Implementation	
	Alternate A: Priority Lane	\$500,000 (apx.)
	Alternate B: Ramp Metering (Oregon Only)	400,000 (apx.)

Part II, implementation, of the demonstration project should be integrated into the safety improvement projects planned by the Oregon Highway Division and scheduled for the spring of 1975. These costs make no provision for additional transit service. It is assumed that any costs for additional transit service will be met from the fares obtained from expanded operations and from local subsidies which may be required. The revenue or source of funds for the demonstration project consists of three sources:

Part I will have the proportional financial distribution of the \$50,000 as follows:

1. Federal Aid to Interstate - 90% or \$45,000
2. Oregon State Highway Division 5.5% or \$2,750
3. Washington State Highway Department -
4.5% or \$2,250

Part II will have the following distribution:

1. Federal Aid to Interstate - 90%
2. The Oregon State Highway Division - Prorated amount by mileage of improvement in Oregon.
3. The Washington State Highway Department - Prorated amount by mileage of improvement in Washington.

The distribution of the local match was based upon the length of the project and the percentage of that length which comes under the respective jurisdiction of Oregon and Washington highway agencies.

JUSTIFICATION

The emergency transportation energy conservation is a major factor for justification as outlined in an act of Congress. This project is expected to provide fuel savings, increase capacity, and reduce pollution and accidents. This project is a "relatively" low cost improvement which would be categorized as a short range improvement. Priority lanes and ramp metering have proven to be very effective measures for improving conditions on transportation networks (see references).

Considering unquantified benefits it would seem that this project is justified. Some of these unquantified benefits include better utilization of the freeway capacity because the proposal will make use of available capacity in the roadway which is now underutilized. This proposal will reduce noise and air pollution per passenger mile of service provided to the public. This demonstration is intended to increase transit ridership and car pool utilization by providing a definite incentive toward usage of these modes.

ENVIRONMENTAL CONSIDERATIONS

The considerations are divided into three major divisions: 1) Economic; 2) Ecological; and 3) Community Service and Values.

The economic impact consists of employment, housing and commercial development. This proposal is not expected to have any substantial affect on these characteristics because it will be done within existing rights-of-way and will only produce a marginal increase in traffic volumes. These aspects also reflect the same impact in the property land use character and tax base associated with the property in the corridor which likewise will not change significantly, if at all. It is recognized that this proposal will provide an incentive, though marginal, for continued development of Clark County, and in particular, the commuters utilizing the Interstate facility between Clark County and areas in Oregon.

The ecological impact includes such things as pollution, wildlife, geological, aesthetics and conservation of natural resources. This proposal is not expected to provide any adverse impacts in terms of noise, air, water and land; rather the opposite is expected at a marginal level; that is, by reducing the number of automobiles on the freeway, one could expect a reduction of air and noise pollution. Since existing highway facilities are used for this project, there will be no impact in respect to wildlife refuges and migration patterns, similarly with water, erosion, slope protection and aesthetic considerations.

There will not be any significant adverse ecological impact as a result of this project. In fact, there will be a positive impact because of the fuel which is to be conserved by this demonstration.

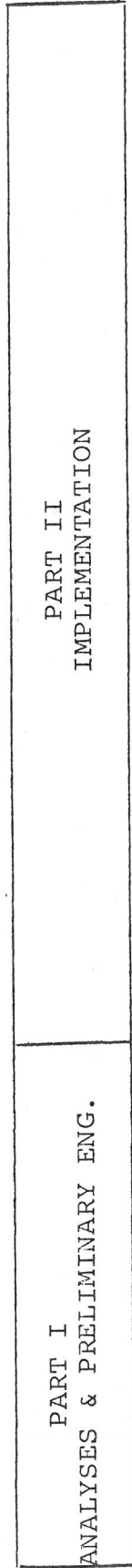
Community services and values will have very little impact, if any. The utilities, emergency service, religious institutions, parks, recreation and entertainment, education, landmarks, health and safety are all well established and will not be changed. The project will not require the acquisition of landmarks, park, recreation and entertainment facilities or religious institutions. It will provide an improvement in the traffic flow in the peak periods which will be an advantage to emergency vehicles using the facility during that time. So again, with this portion of the environmental considerations it is expected that this project will have a marginal improvement in this consideration. It can also be noted that this improvement will require use of some resources such as steel and other materials for the sign and signal structures, rubber or synthetic materials for traffic cones, lights and lenses for the signal and other miscellaneous materials. Some of these will be irretrievable to the resource system.

APPENDIX

N.T.E.C.A.P. DEMONSTRATION PROJECT

INTERSTATE BRIDGE CORRIDOR

PRIORITY TREATMENT FOR HIGH OCCUPANCY VEHICLES



MARKETING

INSTALLATION

PRELIMINARY ENGINEERING

GRANT APPLICATION

DEMONSTRATION OPERATION

DEMONSTRATION EVALUATION

0

3

6

9

12

15

18

21

MONTHS

WORK PROGRAM ACTIVITIES DIAGRAM

REFERENCES

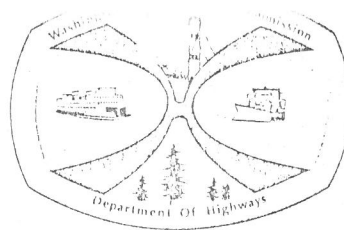
1. Capelle, D.G. et.al., "Feasibility and Evaluation Study of Reserved Freeway Lanes for Buses and Car Pools", Highway Research Board, National Academy of Sciences, Washington D.C., 1972.
2. Pratt, R.H. Associates, Inc, Low Cost Urban Transportation Alternatives: Volumes I & II, Prepared for USDOT, Kensington, Maryland, January 1973.
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4. Wainwright, W.S. "Techniques of Ramp Control", School of Engineering, University of Connecticut, Storrs Connecticut, February 1972.
5. Wilbur Smith and Associates, Bus Use of Highways-State of the Art, National Cooperative Highway Research Program Report 143, Highway Research Board, 1973.
6. Wilbur Smith and Associates, Preferential Facilities for High-Occupancy Vehicles, prepared for the Southern California Rapid Transit District, March 1974.

HIGHWAY COMMISSION

DEPARTMENT OF HIGHWAYS

WASHINGTON STATE FERRIES

Seattle Ferry Terminal, Seattle, Washington 98104
464-7800



Daniel L. Evans - Governor
C.H. Andrews - Director

August 30, 1974

RECEIVED
SEP - 3 1974

Mr. Hurvie E. Davis, Assistant Transportation Director
Columbia Region Association of Governments
6400 S. W. Canyon Court
Portland, Oregon 97221

COLUMBIA REGION ASS'N
OF GOVERNMENTS

Dear Mr. Davis:

We have received your letter of August 26th requesting information regarding the operation of a ferry on the Columbia River. It is very difficult to answer your questions fully unless a proper survey of the conditions to be encountered could be made.

The answer to your first question is extremely hard to make unless a thorough potential traffic survey is made. We question the advisability of a 25 or 50 car ferry when a ferry with a capacity of 200 vehicles might be more advisable. Also, there is considerable difference in the cost between a 25 car ferry and one with double the capacity. A conservative capital cost estimate for a 25 car ferry would be one and one-half million dollars, and for a fifty car ferry, two and three-quarter million dollars.

We have no operating cost figure for either of these sizes, but for a 40 car ferry our daily operating costs for an 8 hour day would be \$450.00. This figure would include crew, fuel and maintenance.

For a short crossing, a speed of not less than 10 or more than 12 knots would be adequate.

You would be controlled by United States Coast Guard regulations and any other local regulations that might be applicable.

You would require adequate terminal facilities on either side. These would - if built in accordance with our standards - cost approximately one million dollars each. The water depth for the entire crossing would determine the maximum draft that your vessel could be built, some minor dredging at the terminals might be required.

Again let me emphasize that these are only rough estimates to give you some

A. H. Parker Chairman
Bremerton

Harold Walsh
Everett

Baker Ferguson
Walla Walla

Virginia K. Gunby
Seattle

Howard Sorensen
Ellensburg

Harold L. Boulac
Secretary

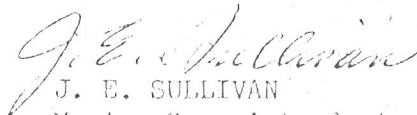
idea of the problem presented. If you are going to proceed further it would be my advice to secure the services of a competent Naval Architect to survey the situation and propose the proper vessel and facilities for that particular operation.

Yours very truly,

WASHINGTON STATE FERRIES

A. F. EIKUM, General Manager

JES:hl


J. E. SULLIVAN
Marine Superintendent

BIKEWAY RESOLUTION

WHEREAS, the Interstate Bridge Corridor Project Management Board recognizes that bicycles are a mode of transportation, and

WHEREAS, conditions in the Interstate Bridge corridor pertaining to bicycle usage are hampered due to obscure routing, and numerous bicycle-vehicle conflicts which have serious implications for cyclists safety, and

WHEREAS, improved facilities for bicycles open the possibility for increased use of the bicycle mode of transportation in this corridor, thereby slightly increasing the I-5 corridor capacity, and

WHEREAS, improved bicycle facilities will enfranchise certain elements of transportation disadvantaged populace, i.e., persons under driving age or unable to drive, previously restrained from the use of the I-5 corridor, and

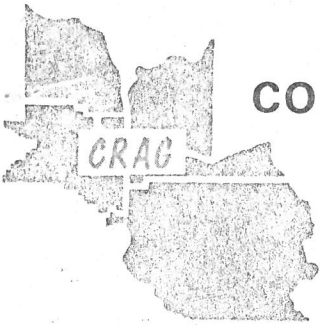
WHEREAS, the proposed Inter-State Bikeway is consistent with the CRAG Comprehensive Bikeway Plan, and is consistent with the plans of the local jurisdictions involved,

NOW THEREFORE BE IT RESOLVED, that the I-5 Corridor Project Management Board supports, the Inter-State Bikeway as proposed in the CRAG Regional Bike Plan. In addition, the Project Management Board urges prompt action by state and local agencies to design and construct this facility.

September 20, 1974

Interstate 5 Corridor Project
Management Board

BY _____
Chairman



COLUMBIA REGION ASSOCIATION of GOVERNMENTS

6400 S.W. CANYON COURT
PORTLAND, OREGON 97221

(503) 297-3726

TO: I-5 Project Management Board
FROM: Hurvie E. Davis, ^{HER} Project Coordinator
SUBJECT: Proposed Legislation by the Administration - Information
DATE: August 8, 1974

Attached is a copy of a letter from U.S. Secretary of Transportation Brinegar to the President of the Senate relative to possible proposed legislation for the imposition of tolls on bridges.

This mechanism could have possible application in the Interstate Bridge Corridor should the Board wish to consider disincentives to the automobile. At the same time it could provide funding for transit improvements.

Should this legislation be submitted to Congress, you may wish to give appropriate guidance to your Congressional delegation.

CLACKAMAS COUNTY

Canby
Gladstone
Happy Valley
Lake Oswego
Milwaukie
Oregon City
West Linn

CLARK COUNTY

Camas
Vancouver
Washougal

COLUMBIA COUNTY

Clatskanie
Columbia City
Practical
Rainier
Scappoose
St. Helens
Vernonia

MULTNOMAH COUNTY

Fairview
Gresham
Portland
Troutdale
Wood Village

WASHINGTON COUNTY

Beaverton
Cornelius
Durham
Forest Grove
Hillsboro
North Plains
Sherwood
Tigard
Tualatin

RECEIVED
AUG 12 1974
City of Portland
Bureau of Planning



THE SECRETARY OF TRANSPORTATION

WASHINGTON, D.C. 20590

July 1, 1974

Honorable Gerald R. Ford
President of the Senate
Washington, D.C. 20510

Dear Mr. President:

In compliance with section 133(a) of the Federal-aid Highway Act of 1973, I am pleased to submit herewith A Study of Federal Statutes and Regulations Governing Toll Bridges. The report reviews and compares the toll provisions of the relevant Federal statutes, discusses our experience in administering them, examines the basis for a Federal interest in bridge tolls, and, finally, makes a number of recommendations for legislative changes relating to bridge toll policy and administration.

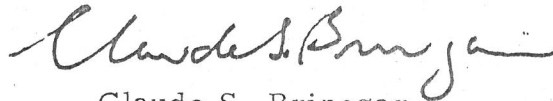
Briefly, we conclude that the existing legislation, as modified by our proposals, provides a sufficient basis to ensure that bridge tolls are reasonable and just nationwide. These proposed legislative changes would provide the Secretary with the authority to stay toll increases for a period up to 180 days pending a determination that the tolls are reasonable and just, and discovery powers similar to those of the ICC, to provide more effective access to information and data on bridge tolls.

In addition, we are proposing legislation to effect a significant policy change. As I indicated in my recent testimony on national transportation policy, we believe future solutions to the urban congestion problem now lie more in the direction of traffic management and improvements to public transportation than in simply adding more infrastructure. In this context, we believe that bridge tolls, in combination with other measures, may be useful in achieving a more efficient utilization of the overall transportation system in a number of major urbanized areas by encouraging higher vehicle occupancies, a more even distribution of traffic throughout the day, and increased transit ridership. Bridge toll revenues could also provide significant financial support for complementary highway or transit improvements. With a few exceptions, the existing Federal statutes now preclude the use of bridge tolls for these purposes.

Therefore, we are recommending legislation to permit the imposition of tolls on bridges (including free bridges constructed with Federal-aid highway funds) in urbanized areas of 400,000 or more population for the purpose of achieving a more efficient use of the urban transportation system, with the revenues from such tolls used for complementary highway or transit capital improvements or transit operating assistance. Secretarial approval would be required for such tolls, and they would have to be part of a plan developed by appropriate State and local officials.

We will be submitting proposed legislation on these recommendations in the near future.

Sincerely,



Claude S. Brinegar

Enclosure

MEMORANDUM

RECEIVED
AUG 12 1974

To: Mr. Dick Granger, Chairman
Interstate Corridor Study

From: John Perry, Planner JP
Tri-Met

COLUMBIA REGION ASS'N.
OF GOVERNMENTS

Date: August 7, 1974

Subject: Methods for improving transit capacity of I-5 Corridor

At the Project Management Board meeting on July 26th, a subcommittee was appointed to consider the various methods of increasing the transit capacity of the I-5 corridor.

This subcommittee met on July 31. In attendance were R.O. Cunningham, OSHD; P.C. Henrichsen, WSHD; Jack Sullivan, ODOT; Mike Kyte, Tri-Met and John Perry, Tri-Met.

After some discussion it was decided to recommend to the PMB that the following studies be undertaken:

1. A study to determine the feasibility of establishing special use lanes for high-occupancy vehicles, parallel to the flow of traffic, on I-5, south of the Interstate Bridge. This study shall include trying to "convert" the two lane section to three lanes without major right-of-way acquisition.
2. A study to determine the feasibility of using ramp control methods in order to provide a smoother flow of traffic on the freeway. High-occupancy vehicles shall be given priority at the ramps.

It is our recommendation that these studies be undertaken concurrently by the Oregon State Department of Transportation at the request of CRAG.

cc: Hurvie Davis, CRAG ✓
R.O. Cunningham, OSHD
P.C. Henrichsen, WSHD
Jack Sullivan, ODOT



OFFICE OF
PLANNING AND DEVELOPMENT
GARY E. STOUT
ADMINISTRATOR

BUREAU OF
PLANNING
ERNEST R. BONNER
DIRECTOR

424 S.W. MAIN STREET
PORTLAND, OR. 97204

PLANNING
503 248-4253

ZONING
503 248-4250

August 6, 1974

MEMORANDUM

To: Hurvie Davis, I-5 Project Coordinator
From: Bill Dirker, Transportation Coordinator
Subject: Policy Recommendations

In response to your request for views on policy directions, I reviewed the basic agreement dated 12/27/73 and a copy is attached.

The goal, which I define as a generalized condition without specific time, is stated in item 8. The specific objective is in item 9. I think we should keep this clearly in mind. We've already missed the 7/1/74 target for a live demonstration project for park and ride. However, quick action on Peck's express bus proposals may bring us closer to this. Most of the items under Phase I have been done.

At this point, I believe our policy should be to pursue those activities and policies that have a high probability of occurrence or achievement. We can make an explicit assessment of this probability and keep moving in the most likely direction to achieve the objective. We should not expand and dissipate our efforts on sophisticated planning activities that are more properly a function of regional planning. For example, from the flow diagram "Develop Alternate Land Use Model". In this time frame we are concerned with, 1980, the I-5 corridor is not going to look very much different than it does today.

A congestion problem has been identified by 1990 even with the I-205 bridge, but that is not the subject of this project. Capacity increases and demand restraints that are likely to be effective by 1980 are the only topics that should be dealt with.

One approach might be to enumerate all reasonable candidate actions that would increase capacity or reduce demand and then assess the probability of these actions actually happening in the following areas:

FILE COPY

- a. physical - Can it really be done?
- b. financial - Existing or current legislative funding sources.
- c. legal - Will lawsuits prevent implementation?
- d. legislative - Is it authorized or is legislation likely to be passed, e.g. tolls?
- e. political - Can we get the needed support at the appropriate level (local, state, national)?

Then develop an implementation program for those that pass the test of probable achievement.

BD:jt

Attachment

A G R E E M E N T

THIS AGREEMENT made and entered into this 27 day of December, 1974, by and between the COLUMBIA REGION ASSOCIATION OF GOVERNMENTS, hereinafter referred to as "CRAG," and the CITY OF PORTLAND, OREGON, hereinafter referred to as "Public Body."

RECITALS:

1. The Interstate Bridge Corridor Project is a cooperative effort of a number of public jurisdictions and agencies (hereinafter specified) to undertake the study and development of alternative methods of providing improved methods of transportation between Vancouver-Portland metropolitan area.
2. The Interstate Bridge crossing the Columbia River is the only motor vehicular facility connecting the Vancouver-Portland metropolitan area, which is currently exceeding its designed traffic capacity during peak hours and approaching or exceeding its capacity during heavy weekend and summer months' travel periods.
3. The degree and duration of automobile, truck and bus traffic congestion is currently causing serious traffic disruption.
4. The Regional Transportation Plan (PVMATS) for 1990 plans for the construction of two additional bridges across the Columbia River within the Vancouver-Portland metropolitan area, but the completion date of the first of the bridges will not be before 1978.
5. In addition to the congested conditions now existing, and the forecast of increased congestion, there exists an interim problem of handling traffic during reconstruction of I-5 north and south of the Interstate Bridge, and the potential problem of emergency vehicles if Interstate Bridge traffic is blocked.
6. The Interstate Bridge is the only facility that presently can be reasonably used by 12,000 Clark County and 4,000 Multnomah, Clackamas and Washington County workers to reach their employment and restriction or temporary stoppage of Interstate Bridge traffic could have serious economic impacts.

7. CRAG will be responsible for the overall project and the following local, state and federal agencies will participate and provide the project costs: Washington State Department of Highways; Oregon State Highway Division; City of Vancouver, Washington; Clark County, Washington; City of Portland, Oregon; Multnomah County, Oregon; Tri-County Metropolitan Transportation District of Oregon; Federal Urban Mass Transportation Administration.

8. The goal of the Interstate Bridge Corridor Project shall be to move people through the corridor more efficiently with minimal environmental damage with the end result of the project to be physical action.

9. The objective of the Interstate Bridge Corridor Project shall be to develop an implementation program for a Vancouver-Portland mass transit system by July 1, 1975, with a live demonstration project under way by July 1, 1974. Primary emphasis will be on park-and-ride, with special focus on peak hour traffic to move Vancouver residents to their places of employment in Oregon.

NOW, THEREFORE, in consideration of the agreements of the parties hereafter stated, the parties agree as follows:

CRAG agrees:

1. To undertake and perform, or cause to be performed, the Interstate Bridge Corridor Project at a cost of \$150,000. (It is expected that some of the work of the project will be performed by some of the participating agencies who will be reimbursed from project funds.)

2. To attempt with all reasonable diligence to complete the project by June 30, 1975.

3. To undertake and perform or cause to be performed, the project in three phases as follows:

Phase I - Phase I objectives are to develop preliminary findings about the problem, its causes and possible solutions in order to develop maximum increase in corridor efficiency without physical alterations, and to initiate non-capital intensive demonstration projects, this phase shall consist of the following elements:

- (1) Analyze 1970 census data to develop commuter origin and destination information.

- (2) Conduct an Origin and Destination study on the Interstate Bridge.
- (3) Prepare initial overview findings on fiscal, legal and institutional problems and possibilities.
- (4) Prepare initial status and feasibility findings on alternative ways of regulating movement:
 - (a) Park-and-ride sites;
 - (b) Other modes, especially rail, bus car-pools;
 - (c) New devices such as tolls, ramp metering, exclusive bus lanes, contra-flow bus lanes;
 - (d) Old devices such as transit operations coordination and rider attractive improvements in the existing bus systems (routing, scheduling, fares, etc.).
- (5) Initiate a line demonstration project.
- (6) Articulate citizen concerns.
- (7) Prepare findings on land use factors.

Phase II - Phase II objectives are to proceed to detail the further information needed to proceed to program phase on the basis of the most promising findings in Phase I, and to develop recommendations, this phase shall consist of the following elements:

- (1) Complete findings delayed from Phase I.
- (2) Study I-5 reconstruction and the problems it creates.
- (3) Analyze Origin and Destination data and develop forecasts, requiring at least the following:
 - (a) Alternative forecasts;
 - (b) Estimated error of forecast;
 - (c) Articulation of the various implications of the forecasts, i.e., (how high does a

particular forecast have to be to force a change in the projected system, and what political, fiscal, land use, etc. elements support the different forecasts.)

- (4) Detail Park-and-Ride system. Focus on existing resource findings from Phase I, and interface with other modes.
- (5) Detail other promising modes, including bridges.
- (6) Detail promising regulatory devices.
- (7) Detail new legal, fiscal and institutional potentials.
- (8) Expand citizen involvement.
- (9) Detail any land use questions.
- (10) Make recommendations on any of above elements in this Phase II.

Phase III - The objective of Phase III is to produce an implementation program based upon Phase II recommendations, this phase shall consist of the following elements:

- (1) Program Park-and-Ride;
- (2) Program all other recommendations;
- (3) Produce the Environmental Impact Statement.

PUBLIC BODY agrees:

1. To compensate CRAG for its services as hereinabove outlined a total compensation for the entire project of Two Thousand Five Hundred Dollars (\$2,500). All such compensation shall be in cash, it being understood that if any part of the work of the project is performed by the Public Body at the request of CRAG, that the Public Body will be reimbursed by CRAG from project funds. Payments shall be payable to CRAG at the beginning of the project in the full amount of compensation as above stated.
2. To compensate CRAG for its services as hereinabove outlined a total compensation for the entire project of Five Thousand Dollars (\$5,000) in the event that funds of the Federal Urban

Mass Transportation Administration are not approved for participation in the project. It being further understood that total project costs will be reduced from \$150,000 to \$130,000 and that the scope of work will be modified as agreed upon by the Project Management Board.

3. To provide information and data and otherwise fully cooperate with CRAG in the performance of the project.

4. To appoint a representative to the Project Management Board.

Both Parties agree:

1. To cooperate fully with each other in the performance of the project.

2. That certain of the initial work of the project has already been undertaken and shall be considered part of the project and subject to payment as herein specified both to CRAG and to the Public Body by way of reimbursement from project funds.

3. That the project will be directed by a Project Management Board which shall consist of a representative from each of the agencies or jurisdictions participating in this project.

IN WITNESS WHEREOF, the parties hereto have caused this agreement to be executed on the day and year first hereinabove written, CRAG acting by the Chairman of the Executive Board, and the CITY OF PORTLAND, OREGON acting by its Mayor and Commissioner of Public Works.

COLUMBIA REGION ASSOCIATION
OF GOVERNMENTS

By William H. Hollo
Chairman - Executive Board

CITY OF PORTLAND, OREGON

By Richard H. ...
Mayor

By Richard ...
Commissioner of Public Works

Approved as to form:

John W. Burns
City Attorney

CITY OF PORTLAND
INTER-OFFICE CORRESPONDENCE
(NOT FOR MAILING)

From Traffic Engineer
To Office of Planning & Development
Addressed to William Dirker
Subject I-5 Corridor Project

July 31, 1974

I received your memo of July 29 regarding the I-5 Corridor Project, and in 6. (b) it indicates modification of signal at Going and Interstate to reduce the queues which often extend back on the freeway.

This is precisely what we plan on doing as part of the Going Street project. However, if this change and funding can be incorporated in this I-5 Corridor Project it would mean that the city could save something in the range of \$10,000 to \$15,000.

Would you advise me as to what the status of this is, schedule, that type of thing? If we get federal funds to do this I think it is the way to go.

We have also been looking at the possibility of installing a signal at Portland Boulevard, and we are also having some problems with the I-5 ramps at Alberta and Killingsworth Street. The same question applies here, what is the status, when might we look for funding on this project?


D. E. BERGSTROM
Traffic Engineer

DEB:ba

RECEIVED
AUG 1 1974
City of Portland
Bureau of Planning

Revised Edition
7/29/74

IX RECOMMENDATIONS AND ACCOMPLISHMENTS

This analysis of transportation problems in the Interstate Bridge Corridor has resulted in the identification of seven immediate to short-range, low-cost improvements in transportation which are recommended for implementation in the corridor. Since this project is oriented towards physical action, the project staff and agency representatives on the Project Management Board have been actively pursuing implementation of some of the needed improvements as they were identified earlier. Therefore, some of the proposed improvements have been acted on, others are in the process of being implemented and still others are listed here as recommendations for implementation.

These seven improvements include express bus service (between Clark County/Vancouver and Portland consisting of two routes, interim park and ride facilities and use of existing rolling stock), intersystem transfers, consumer information service (including toll free telephone line, route maps and identification of bus transfer points in telephone directories), region wide carpooling program, exclusive lane for high occupancy vehicles, highway operations and new legislation in the State of Washington.

A description of these improvements follows:

1. Express Bus Service in the Corridor

An analysis of existing travel during the a.m. and p.m. commute periods for work trips indicated a need for the establishment of direct express bus service between the Mill Plain Blvd. and Hazel Dell Corridors to the Lloyd Center office complex and downtown Portland. The proposed service would primarily serve work trips and would operate

only during the morning and afternoon commute periods. Both the Lloyd Center office complex and downtown Portland will be served by the same route. The buses would first serve the Lloyd Center area and then proceed to downtown via the Steel Bridge. The routes in downtown would use the 5th-6th Couplet to a terminal point in the College Street area. During the afternoon the route would be reversed.

Morning buses will serve commuters with report times at 7:30, 8:00 and 8:30 a.m. in downtown. Evening buses will begin departing downtown shortly after 4 p.m. with service every half hour to 5:30 p.m. for a total of four p.m. trips. Care should be taken to insure that the bus departing the downtown area at 4 p.m. arrives at the Lloyd Center at a time convenient to serve the large number of Federal office workers released at 4:15 p.m. Other buses would be similarly scheduled.

Route No. 1 (Service for the Mill Plain area) should begin at the intersection of Mill Plain Blvd. and Ellsworth Avenue. Buses will proceed west on Mill Plain Blvd. to Andresen Rd., turn south to MacArthur Blvd., then west to Mill Plain Blvd., thereon to the I-5 freeway, exiting at Fourth Street for a stop at the Vancouver-Portland Bus Terminal to permit alighting, transfers and boarding of additional passengers. From the VP Terminal, buses will proceed via I-5 on an express route to the Lloyd Center area, stopping as necessary in that area, and then proceeding to the downtown Portland area via the Steel Bridge.

Route No. 2 (Service to Hazel Dell) should begin at a Kiss and Ride facility in the Columbia River High School area. Buses will then proceed south on N.W. 9th Avenue to 78th Street and turn east to Old U.S. 99, turn south to I-5 and utilize the freeway to Fourth Street and continue in the same manner as route 1.

It is also recommended that several Park and Ride facilities be established in existing parking lots along these two routes. In the Mill Plain route, park and ride lots should be located at the Tower Mall, Grace Luthern Church and Hudson's Bay High School. For the Hazel Dell Route, park and ride sites should be located at Hazel Dell Evangelical Church, Messiah Luthern Church and possibly the Hazel Dell Fred Meyer shopping center.

These park and ride facilities should be adequately identified through the use of informational signs. In addition, signs noting the location of the larger sites should be placed along those main streets leading to the site. Some Federal aid funds may be used for these facilities.

It is recommended that Vancouver-Portland Bus Company provide this service. This carrier presently provides service from the Hazel Dell area and several locations within the city of Vancouver to both the Lloyd Center area and downtown Portland. In addition, the O-D survey revealed that a number of persons who reside in the Mill Plain-Elvd. corridor presently travel via this carrier by use of the park and ride and kiss and ride options.

This carrier, in instituting this express commuter service, should be given authority by both the Washington Utilities and Transportation Commission and the City of Vancouver to transport intrastate passengers between the Hazel Dell and Mill Plain Blvd. corridors and downtown Vancouver. This would make the service more viable and would provide service to Clark County/Vancouver residents where none presently exists and would provide additional and improved service in the Mill Plain Blvd. area. Since the Vancouver-Portland Bus Company is a private operator which receives no operating subsidy, the cost of the service must be borne thru the farebox. Therefore, a demonstration period of three months is recommended for this service if provided by the private carrier. At the end of three months, if the patronage is not meeting the cost of the operation, a subsidy would be necessary to enable the operator to continue providing the service.

Discussion between the project staff and the owner of the Vancouver-Portland Bus Company indicates that he is able and may be willing to provide the proposed service for a three month trial period under the above conditions. Should this prove unfeasible, other options which might be considered include:

1. Formation of a Clark County Transit District to provide this and other services.
2. Develop a contractual arrangement with Tri-Met to provide the proposed service, or
3. Induce another private carrier (Evergreen Stage Line) to provide the service.

2. Intersystem Transfers

It is recommended that a program of providing intersystem transfers between Tri-Met and Vancouver-Portland Bus Company and Vancouver Transit System be instituted. This proposal calls for riders from Vancouver/Clark County to Portland on the Vancouver Transit system to pay .35 fare and be allowed to transfer to the private carrier and pay only an additional .10 to .35. Transfers to Tri-Met buses would be free. This transfer arrangement would result in a total one way trip charge of .45-.70 which is a reasonable fare. Trips in the opposite direction would require the rider to pay .35 on Tri-Met, deposit .10-.35 fare on the private carrier and receive a free transfer to Vancouver Transit Systems. Transfers of the public carriers collected by the private carrier would be billed back to the public carriers at .35 each. A similar arrangement may be worked out with Evergreen Stage Lines, the private carrier serving the Camas-Washougal area. Discussions on this matter have been underway for some time with the Vancouver-Portland Bus Company, Vancouver Transit System, and Tri-Met.

Consideration must be given to the private carriers, so that they will not receive any reduction in passenger revenue as a result of this procedure. The private carriers, unlike the public carriers, receive no subsidy to insure a continuation of service.

3. Consumer Information Services

To improve customer convenience, provide additional public information and improve comfort for riders of public transit, thereby encouraging additional ridership, it is recommended that the following customer services be instituted:

- a. Tri-Met should install toll free telephone service to its information office. This can be done for a nominal cost of approximately \$6 per month plus 30¢ per call, and would provide Clark County residents with free information relating to Tri-Met lines when planning trips into the Portland area.
- b. A route map should be placed in the Vancouver telephone directory illustrating Tri-met, V-P Bus Co., Evergreen Stage Lines and Vancouver Transit System routes and points of transfer. The same map could also be placed in the Portland directory. The map will also contain information numbers for all four carriers.
- c. Tri-Met should review the location of bus shelters planned at Interstate and (1) Killingsworth Street and (2) Portland Blvd. and place the shelters in such a manner that passengers waiting in shelters for buses on both lines may see buses approaching so that they can move to the proper stop to complete their transfer.

4. Expansion of the Regional Car Pool Program

A Federally-funded regional car pool program was recently undertaken in Multnomah, Clackamas and Washington Counties which was administered by the Oregon Department of Transportation. This program was a very intensive computerized program for the three county area. At about the same time, the Washington State Department of Highways had a smaller car-pool program underway in Clark County. The Corridor project staff felt that greater success could be obtained by incorporating Clark County into the regional program of ODOT. Consequently, staff worked with ODOT and ~~had~~ the WSHD to expand the regional car pool program to include Clark County. Details for expansion of the program are being worked out and the program should be underway in Clark County in the very near future.

Expansion of the program in Clark County will include the following improvements.

- a. Provide maps, information folders, and car pool application forms in public places in Vancouver and Clark County.
- b. Provide a toll free number which Vancouver residents may call to obtain car pool information.
- c. Expand the car pool grid system or develop a manual system to include the populated areas of Clark County in the program.

5. Exclusive Lane for High Occupancy Vehicle Lane (NTECAP Demonstration Project)

An application for Federal funding has been submitted by the project for implementation of a high occupancy vehicle lane under the National Transportation Energy Conservation Action Plan. This lane would be on the I-5 freeway extending from Vancouver to a point in North Portland and provide a special vehicle lane for buses and high occupancy autos to relieve traffic congestion on the freeway and provide an incentive to utilize high occupancy vehicles in the corridor. The lane would be provided in the south bound direction during the morning commute period.

6. Recommendations expecting to cost not more than \$50,000 for improving the existing highway operations consist of the following:

- a. Installation of a signal at the Portland Blvd. northbound off-ramp terminal with ramp queue detection and logic to prevent queue from extending back on the freeway.
- b. Modification of the signal at Going Street and Interstate Avenue to reduce the queues which often extend back on the freeway. A measure similar to item (a) will aid this problem.
- c. Analyze Union Avenue northbound on-ramp to I-5 for pavement markings revision i.e., traffic buttons, etc., to improve the freeway operations.

7. During Phase I of this project, it was apparent that new legislation would be needed in the State of Washington

-
- d. Revise the pavement makings on I-5 between Union Ave on-ramp and the North Portland Harbor bridge to prohibit lane changes approaching the curve.
- e. Utilitize the shoulder as a through lane at Portland Blvd. S.B. and Portland Blvd. and Lombard Street N.B.
- f. For southbound traffic flow ramp metering at Columbia Blvd. and Lombard St. could be used in place of utilizing the shoulder. Northbound ramp metering could be done at Going St. and Denver Ave. Dynamic warning sign should be used in place of utilizing the shoulder. Modification of signal progression on Interstate Ave, Williams Ave, (Vancouver Ave) and Union Ave to reduce stops for north (south bound traffic would discourage some motorists from using I-5. Cost would be between \$270,000 and \$400,000.
- g. In Vancouver, were it was not for reconstruction, the following recommendations would be made:
1. Eliminate southbound on and off-ramps at 39th street, and construct a north to south ramp from the intersection of Old US 99 and Hazeldell Ave. to the south bound on-ramp from Old US 99.
 2. Extend the southbound 4th Plain and Mill Plain on-ramps to a length of approximately 1,300 feet.
- h. Install a traffic signal at the intersection of Union Ave. and Marine Drive.
- j. Queue detection and override logic be installed at the Hayden Island ramp terminals now under contract for signal installations.

that would enable Clark County and the cities therein to create a county-wide transit system for the people of the county. Such transit system would be established as identified in Chapter II and would have authority to contract with other systems, if necessary, to provide service from the county to areas outside the county and state for the benefit of county residents.

In addition to this need for new legislation being identified by the project, elected officials and citizens in Clark County as well as elsewhere in the state saw the need also. As a result, legislation similar to that identified by the project was passed by the Washington State Legislature in April, 1974 (House Bill 670). This legislation enables counties in Washington other than King County to create a county transportation authority to provide public transportation service. It also authorized, subject to voter approval, a .3% sales tax to finance the service. The next step now is for Clark County and the cities therein to take advantage of the authority given them. Some initial developments are already underway in the county.

It is recommended that the Tri-County Metropolitan Transportation District of Oregon (Tri-Met) begin immediate negotiations with the privately-owned Vancouver-Portland Bus Company for the purchase of that system. Purchase of the privately owned system by Tri-Met would provide for the interface of publicly owned systems in the corridor and would result in the provision of transit

service in the corridor as dictated by public policy. Tri-Met or the authorized Clark County transportation authority should also consider the possible purchase of Evergreen Stage Line or at least part of its operation which serves the Camas-Washougal area, part of the City of Vancouver, and certain unincorporated areas of the county.

The energy crisis, lack of additional vehicular capacity on the Interstate 5 facility and the environmental problems facing the area require early favorable action on the part of those involved in solving the transportation problems in the Portland-Vancouver Interstate 5 corridor.

M. Dirker

COLUMBIA REGION ASSOCIATION of GOVERNMENTS

6400 S.W. CANYON COURT
PORTLAND, OREGON 97221

(503) 297-3726

TO: I-5 Project Management Board
FROM: Hurvie Davis, Project Coordinator
RE: Minutes of July 19, 1974, PMB Meeting
DATE: July 29, 1974

The meeting was called to order and the minutes of the previous meeting were approved as transmitted to the members of the Management Board.

The next item was the project status. The staff is continuing to work with local officials to implement the express bus service as recommended by the Phase I report. The Citizens Committee has been active and submitted a report dated July 3, 1974, which contained several significant items which will be helpful in finalizing the Phase I report.

The status report also contained a brief description of the work activities now underway in Phase II which basically is the developing of the distribution model which will be used in forecasting the trips for the design year. Information is being obtained relative to the CRAG sketch planning land use base data and the Governor's Task Force base data which will aid in establishing the land use characteristics for Phase II of this project. The staff was desirous that the Project Management Board give some direction as to the policy assumptions which the Board would like to have examined for the land use base data and also for the modal split. The philosophy for this and additional detail will be transmitted by staff to the Project Management Board members so that they may respond appropriately.

With respect to the Project Management Board's and citizen's review comments on the draft Phase I report, it was reported that a number of the comments applied to particular details while others to the intent or direction of the report. Some comments appeared to be in conflict with others. Subsequently, in order to provide direction for staff, the Chairman selected a subcommittee to review these comments in more detail and to direct staff to incorporate appropriate alterations. Members of the subcommittee are: Dick Barnum, Commissioner Granger, Representatives from ODOT and WSHD, Bill Dirker, City of Portland, Edgar Waehrer, Tri-Met and Pat Blackwell, CAC. The subcommittee was

CLACKAMAS COUNTY

Canby
Gladstone
Happy Valley
Lake Oswego
Milwaukie
Oregon City
Sandy
West Linn
Wilsonville

CLARK COUNTY

Camas
Vancouver
Washougal

COLUMBIA COUNTY

Clatskanie
Columbia City
Prescott
Rainier
Scappoose
St. Helens
Vernonia

MULTNOMAH COUNTY

Fairview
Gresham
Portland
Troutdale
Wood Village

WASHINGTON COUNTY

Beaverton
Cornelius
Durham
Forest Grove
Hillsboro
North Plains
Sherwood
Tigard
Tualatin

given two basic charges: (1) to provide sufficient information to finalize the report and (2) to narrow the alternatives and potential improvements for Phase II of the project.

The final agenda item was presented by Steve Oppenheim, CRAG staff, who is developing a regional bikeway plan. His presentation related specifically to the Interstate Bridge Corridor in which there is a link with the bicycle path network connecting Vancouver and Clark County with downtown Portland. He asked the PMB to provide a resolution adopting or approving the concept of the bicycle path, if there was concurrence and support for it. The chairman instructed him to prepare such a resolution to be presented at the next meeting.

Having no further business, the meeting was adjourned.

Present

Pat Blackwell, LW Voters
Dick Barnum, RPC of Clark Co.
Pierre Henrichsen, WSHD
Chuck Neumayer, WSHD
Glenn Davis, Vancouver
Larry Lange, Columbian
John Perry Tri-Met
Donna Dunbar, Tri-Met
R.O. Cunningham, Oregon Highway Div.
Edgar Waehrer, Tri-Met
Dick Granger, Clark County
Alice Bryant, LW Voters
Carol Hansen, Van. AAUW
Jerry Peck, Vancouver-Portland Bus Co.
Dick Carroll, WSHD
Bill Dirker, Portland
Eric Oein, City of Vancouver

Hurvie Davis, CRAG
John Krawczyk, CRAG
Reed Gibby, CRAG
Steve Oppenheim, CRAG

COLUMBIA REGION ASSOCIATION OF GOVERNMENTS

Memorandum July 29, 1974

To: I-5 Project Management Board

From: Hurvie Davis, ^{NSD} Project Coordinator

Subject: Policy Direction for Corridor Transportation System
 Planning Model

As the designated representative of your agency which is providing the financial support for this project, you are requested to provide staff with policy direction to assure that your agency's concerns are addressed in this effort. To aid you in providing this direction in policy, there are two attachments; namely, activity flow diagram which describes the process and suggestions, and only suggestions, for policies. Please describe the policies you would like tested and submit to this office by August 9 so that staff can assemble them for the next PMB meeting.

Also, included for information and review are the minutes of the last PMB meeting.

POLICY DIRECTION SUGGESTIONS

I. Land Use Policy: What types of population and employment distribution should be considered?

- A. Continuation of existing growth to 1980.
- B. CRAG Design population and employment for the Radial Corridor concept scale back to 1980.
- C. Governor's Task Force 1990 population and employment.
- D. Special adjustments of any of these.
- E. Use more than one to permit the viewing of an alternative(s).

Note: The Phase II work program calls for 1980 forecast.

II. Distribution Policy: Should the distribution model be restrained?

Staff proposes the use of an electrostatic model for distribution because it is relatively simple and can be restrained.

III. Systems and Network Policy: What assumptions should be established to guide the development of the systems and networks?

- A. Should the highway network include I-205?
- B. Is Union Avenue transitway a given?
- C. What frequency of service, speed, capacity, etc. should be assumed for transit & highway networks?
- D. What systems should be tested? Bus, Light Rail, Transit Expressway?
- E. Staff is planning to use peak hour analysis to network rather than a 24 hour analysis.
- F. Should a Marine System be included as a part of the transportation network between I-205 and Camas? Any other locations?

IV. Modal Split Policy Assumptions:

- A. Should the network be restrained for autos?
- B. Should auto tolls or other disincentives be used?
- C. Should high fuel cost and/or rationing be included? If so, how much?
- D. What parameters reviewed for sensitivity.
- E. Should social and economic incentives to encourage high occupancy vehicles be used?
- F. Should efforts be made to reduce travel demand.

THE CITY OF
PORTLAND



OREGON

OFFICE OF
PLANNING AND DEVELOPMENT

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ADMINISTRATOR

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PLANNING

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503 248-4253

ZONING
503 248-4250

MEMORANDUM

July 29, 1974

TO: Don Bergstrom, Traffic Engineer
FROM: Bill Dirker, Transportation Coordinator *WD*
SUBJECT: I-5 Corridor Project

The CRAG I-5 Corridor Project to increase the capacity of this corridor will recommend, among other items, that the Vancouver-Portland Bus Co. establish express service to the Lloyd Center and to downtown. To make this effective, there may be some traffic operational adjustments needed. Hurvie Davis, CRAG's project coordinator and Mr. Peck, the bus operator, will be in touch with you to discuss this.

The City has put a priority on this I-5 Corridor Project and has contributed financially to it. Your advice and assistance to this operation will support this project.

Attached: Project Report extract

cc: Davis - CRAG

HURVIE

INTERSTATE BRIDGE CORRIDOR PROJECT

PRELIMINARY

A TRANSPORTATION EVALUATION:

PHASE I - LOW COST IMPROVEMENTS

Prepared by

Columbia Region Association of Governments
in cooperation with OSHD, WSHD, City of
Portland, Multnomah County, City of Vancouver,
Clark County and Tri-Met.

Portland, Oregon

June 1974

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PRELIMINARY

PRELIMINARY

CHAPTER II INTRODUCTION

The lifestyle of today, as many Americans know it, is greatly affected by our transportation system. Americans enjoy a higher degree of mobility than perhaps any other people in the world. This high degree of mobility has been brought on by the emergence of the private automobile and has enabled many Americans to reside in single family dwellings on large lots outside the central cities.

This same degree of mobility and ~~a similar~~ lifestyle is also enjoyed by the people of the Portland-Vancouver region. The private automobile plays a major role in the region and consequently, planning for the automobile to continue this role in the future has taken place. The results of this planning is described in the Portland-Vancouver Metropolitan Area Transportation Study Plan (PVMTS) which calls for a highway plan that provides the mid-60's level of mobility up to the year 1990. The plan calls for continued dependence on the private automobile as the major means of regional transportation. With the environmental problems facing urban areas today and the recognition that our present supply of energy for the private automobile is a finite resource, transportation planning for the region has taken new direction.

This report describes additional planning being undertaken in one section of the region which places primary emphasis on public transportation. This planning is identified as the Interstate Bridge Corridor Project and is a special cooperative effort of local, State governments and the Columbia Region Association of Governments (CRAG) to improve transportation in the Interstate 5 corridor between Vancouver/Clark County, Washington and Portland, Oregon. The Interstate Bridge crossing the Columbia River is currently the only highway facility connecting the Oregon and Washington portions of the Portland-Vancouver metropolitan area. Vehicular traffic on the bridge is exceeding its capacity during AM and PM commute periods and is approaching or exceeding capacity during heavy weekend and summer months travel periods

resulting in serious traffic congestion.

The PVMTS Plan calls for the construction of two additional bridges across the Columbia River within the metropolitan area. One of these, the Rivergate crossing is not committed and will be subject to review in the region's continuing transportation planning process. The other crossing, the I-205 bridge, is committed but the completion date is still some years from construction and maybe delayed. In addition to the existing congestion in the corridor and forecast to become increasingly congested, there exists an interim problem of handling traffic during forthcoming reconstruction of Interstate 5 on both the Oregon and Washington approaches to the bridge.

The Interstate Bridge Corridor Project is a three-phase project over an eighteen-month time frame. Primary emphasis is on public transportation with both interim and long-range park and ride facilities contemplated. Phase I of the project is to develop preliminary findings about the problem and its causes and to develop early non-capital intensive type of solutions which can be implemented as demonstration projects. Completion of Phase I is scheduled for June 30, 1974. Phases II and III are to identify more permanent capital intensive public transportation improvements, to prepare an implementation program and to assess the environmental impacts of such improvements. Completion of the entire project is scheduled for June 30, 1975.

The project is not designed to address the merits of the Rivergate or I-205 river crossings but is to optimize the capacity of the existing and planned reconstructed Interstate 5 facility. In developing more capital intensive improvements for Phases II and III of the project, the I-205 crossing will be considered as a given. The need for additional transportation facilities across the Columbia River will be addressed by the Governor's (Oregon) Task Force on Transportation and as part of CRAG's continuing planning process.

There are other transportation planning activities being conducted in the region and work under this project will be coordinated with these activities. These are:

1. CRAG's new land use and transportation planning
2. Governor's Task Force on Transportation
3. Tri-County Metropolitan Transportation District of Oregon (Tri-Met) Transit Station Program
4. Portland Model Cities Union Avenue Project, and
5. Land use/transportation planning efforts of local and state agencies.

In addition to coordination with other on-going planning in the region, it is imperative that this project incorporate as much citizen participation as is possible within the scope of the project. To accomplish this, four citizen committees have been formed to provide input and direction to the project. These committees are as follows:

1. Public Awareness
2. Operational Improvements
3. New Systems
4. Environmental Impact

Each committee has certain functions and is to serve in a special advisory capacity to the project. It is critical that the needs and desires of the citizens affected by the project be fully identified and addressed if the project is to be successful.

The project is directed by a Project Management Board comprised of representatives from local and state agencies/ jurisdictions participating in the specially funded project. These participants are as follows:

1. Washington State Department of Highways
2. Oregon State Highway Division
3. Clark County, Washington
4. Vancouver, Washington
5. Tri County Metropolitan Transportation District of Oregon (Tri-Met)
6. Multnomah County, Oregon
7. Portland, Oregon

Phase I of the project is funded entirely at the local and state level. The Federal Urban Mass Transportation Administration is participating in the funding of Phases II and III. Work on the project is being accomplished by the CRAG staff with certain activities being performed by participating agencies.

III PROJECT OBJECTIVES

The Interstate Bridge Corridor Project Phase I objectives have been established to provide for transportation improvement within the corridor. The objectives are oriented to physical action and actual improvement rather than a study with recommendations. Subsequently, this project not only analyzed problems and proposed solutions but addressed and emphasized the issue of implementation programs.

II Conduct an origin-destination survey for highway and transit users and analyze the data in order to determine the travel patterns for those using the Interstate Bridge in the morning peak. This survey was expected to update the previous survey of this type conducted in 1960 and 1970 (Portland CBD transit only). In addition, census tract, accident, traffic volumes and other data were analyzed to aid in the study of travel patterns and characteristics.

III Determine through study and field review the major causes of congestion and low cost (non-capital intensive) solutions to reduce the impact of the problem. The solutions are to emphasize federal demonstration type improvements and the grant applications for such demonstrations.

IV Increase the corridor capacity without major construction but with due consideration to the desirability of reducing the consumption of fossil fuels.

V Determine criteria to evaluate and measure the effectiveness of the demonstration projects and other improvements.

VI Conduct a sufficient search of contemporary literature to evaluate to desirability of potential improvements and, in particular, innovative or new possibilities for both short range, non-capital intensive, and long range, capital intensive, improvements.

INTRODUCTION

A good data base is an important component of any study or project. Data concerning the social and economic conditions of an area, the travel patterns of an area's residents and the attitudes of an area's residents concerning their transportation problems, must be viewed in setting up a program of improvements to deal with these local problems.

In the first phase of the I-5 Corridor project, the staff has focused on four types of data: the 1970 Census, the Interstate Bridge Origin-Destination Survey⁽⁶⁻¹⁾ which was conducted by the Washington State Highway Department, Transit and highway traffic data. Census data has been useful in giving each type of datum supplied a partial description of the problem and issues and the indegration of all of them enabled a total picture to be established. Caution was used in the collection and assembling of the data to reduce bias and faulty implications; furthermore, conclusions were carefully established from the data.

CENSUS DATA

The 1970 Census Data for the Portland Metropolitan Area indicated that 12,223 Clark County residents work in Portland and the adjacent Oregon Counties. A total of 917 Clark County residents reported they were employed in the downtown Portland area and 8,350 reported that they worked in other parts of the city. It is important to note, however, that the Census bureau

cautions that its figures for CBD employment are almost always understated due to reporting difficulties. New construction, which has increased the number of office facilities in the downtown area since 1970 may also contribute to an increased number of persons employed in the CBD. Persons from Clark County employed in other parts of the Portland area include:

Multnomah County (other than Portland)	1,650
Clackamas County	685
Washington County	610

Growth in Clark County appears to be taking place at a rather rapid rate. In 1970, Clark County had 128,454 residents. In 1973, population was estimated at 135,154 an increase of 6,700 or 5%. CRAG projections indicate that Clark County will continue to grow at a substantial rate, reaching between 158,000 and 171,000 persons by 1980. These projected population increases further point up the need to explore and develop transportation alternatives for Clark County residents who commute to the Portland area.

Census data has also been useful in giving the staff an "area profile" on the social and economic characteristics of the residents of Vancouver and surrounding Clark County areas. The O.D. study provided a very detailed breakdown of the trip origins and destinations of those Clark County to Portland Commuters who cross the Interstate Bridge during the period between 6 - 9 a.m. known as the morning peak period. The O.D. study also provided a look at the commuter's social and economic condition as well as exploring some of his attitudes on such subjects as public transit and car pools.

All data, of course, must be viewed within its limitations. The 1970 Census data may be somewhat dated due to the rapid growth in the region and particularly in Clark County, and a very high rate of inflation which has substantially ^a affected wages and costs over the past three years.

ORIGIN AND DESTINATION SURVEY

In December, 1973, between the hours of 6:00 and 9:00 a.m. on certain weekdays, the Washington State Highway Department (WSHD) conducted a ⁶⁻⁹ survey of drivers entering the I-5 freeway in Vancouver and southern Clark County. Later, in February of 1974 an O-D survey was conducted on the Vancouver-Portland Bus Company lines operation ^{11/6-} in the Interstate Bridge Corridor. The primary purpose of the survey was to determine the points of origin of persons crossing the Interstate Bridge into Oregon, the destinations in the Portland area, and other travel characteristics and social-economic data. ~~The most~~ ^{THE} ^{PREVIOUS} recent survey in this corridor (prior to this one) was conducted in 1960.

Several methods of conducting the survey were considered.

These included:

1. ^{origin/destination} Photographing license plate numbers of cars passing a given point on the freeway, comparing the numbers with (WSHD) records and mailing auto owners a survey questionnaire, and
2. Distributing questionnaires at freeway entrances in the Vancouver area.

Both of these methods were considered to be effective, however, the latter method was chosen since the former might be resented by some drivers who consider the photographing process an in-

vasion of privacy and the ambient light in the morning may not be sufficient for photographing.

Questionnaire: ¹⁷ The questionnaire contained 15 questions and provided information on the following subjects in addition to the trip origin and destination (see Figure W-1).

1. Type of vehicle
2. Parking costs
3. Purpose of trip
4. Willingness to use mass transit
5. Reasonable cost for mass transit trip
6. Car pool membership
7. Interest in carpool
8. Sex
9. Family size
10. Number of vehicles owned by the commuter
11. Age
12. Income bracket

Space was also reserved on the card for the respondent to comment on pertinent items of interest. Over 14,000 questionnaires were distributed to motorists. Responses were received from 3,500 persons. The sample return was about 25% which exceeded the value of 20% which is considered the minimum sample size to have obtained representative data.

TRIP DISTRIBUTION

The study demonstrates that there is a fairly uniform distribution of person trips to destinations in the Portland area because no single employment zone received more than 20% of the total trips from Clark County and only downtown Portland (which received 18% of the incoming trips) was significantly close to the 20% figure. Most Vancouver commuters were bound for the North Portland area (4,095 trips) and West Portland (3,679 trips). While these areas are very large (96 square miles) they both contain major employment centers which re-

ceive a significant number of person trips. These include:

1. Downtown Portland	2,314 trips
2. Lloyd Center	1,384 trips
3. Northwest Industrial District	1,215 trips
4. Swan Island	820 trips
5. Portland North of Columbia Blvd.	722 trips

Note: Trips are expanded and include transit trips
(A complete summary of auto destinations is included in
tables I and II.)

Six transportation corridors were ~~isolated~~ ^{IDENTIFIED} which appear to contain most of the points of origin for a large share of the Oregon bound trips. These corridors are composed of those traffic zones which border on arterial streets. The number of person trips originating in each corridor bound for destinations in Oregon is shown below:

Mill Plain Corridor	2,486
Fourth Plain Corridor	2,190
1-5 Corridor	2,056
78th Ave. Corridor	1,864
Hazel Dell & Vicinity	1,712
Lewis & Clark Hwy. Corridor	1,384

Note: Portions of some corridors overlap

Trips originating from these corridors make up approximately 71% of the total Clark County to Oregon trips. The remaining trips originate in the following areas:

Southwest Vancouver	1,090
External Stations	1,039
Northeast Clark County	595
Northwest Clark County	47
Other Vancouver	155

AUTO OCCUPANCY

Auto Occupancy for Oregon bound trips tends to be rather low. The overall occupancy rate from Clark County is 1.24 persons per car.

In relation to destinations, auto occupancy tends to be higher in those areas where employment is relatively concentrated and lower where places of employment are scattered. Distance from point of origin does not appear to affect the occupancy rate except that work locations tend to be more scattered in distant employment locations. ~~Auto occupancy by destination is shown in table III and includes that portion of N. Portland south of Columbia Blvd. and excluding Lloyd Center, Swan Island, Rivergate, Grand Avenue area.~~

The one occupant auto trip is overwhelmingly dominant among Clark County to Oregon commuters. Over 81% of the commuting autos contain only the driver. Only 14% contain two occupants with 5% containing three or more. Total occupancy rates are shown in figure IV-2.

TRANSIT RIDERSHIP

Only 3% of the total work trips during the time of the survey were made by transit. The majority of these trips (87%) were made to the downtown Portland area. The only other destination of any significance was the Lloyd Center area which received 6% of the total transit trips. A complete breakdown of trips (by destination) is shown in table II.

Attitudes on transit ridership appear to be on the favorable side. In response to the question "If a fast, efficient and comfortable transit system were available from convenient Park-Ride lots in the Vancouver area to the major employment and business centers in the Portland area, would you use transit rather than drive your car in the same trip?", 37% responded in the affirmative, 35% responded no and 28% were undecided.

A 50¢ fare appears to be the optimal charge for transit as indicated by respondents to a question on this subject. A complete breakdown of what those surveyed feel it is a fair charge for transit is illustrated in figure IV-3.

It is interesting to note that most respondents selected a fare that was a multiple of .25 as what they considered to be a reasonable charge for transit. Responses for these fare rates were significantly greater than for a 35¢ fare which is the base fare presently charged by Tri-Met and Vancouver Transit system. Perhaps this indicates a tendency for people to think in terms of a quarter (and multiples thereof) as a charge for such services. This factor should be kept in mind in setting a fare structure for service from the Vancouver area.

SOCIAL - ECONOMIC CHARACTERISTICS:

From the demographic data obtained from the O-D survey, it can be said that the "typical" Vancouver to Portland commuter is male, between 25 and 35 years old, has access to two or more cars, and an annual income of between \$10,000 and \$14,000. While the so called "typical" person is usually more of a fiction than of reality, the personal characteristics expressed by this profile do give us some idea of the kinds of persons who make the daily trip to work from Vancouver to Portland.

Figure III shows the age bracket of the respondents. It is interesting to note the relatively young age at which the table peaks, rising rapidly from the 15-19 brackets, gradually dropping to the 55-59 age group and falling rapidly in the 60+ age brackets. It is not known whether these figures reflect

the age composition of the labor force, but the number of younger commuters may indicate a greater willingness among younger workers to undertake the long daily trip to work. The rapid decline in respondents ages 60+ is probably indicative of the frequency of retirements in these age groups.

Figure IV which notes access to vehicles indicates a high percentage of multi-vehicle families. The presence of two or more autos in so many families might decrease the receptivity of persons to public transit.

Figure V shows the income levels of respondents. It would appear that the average Clark County Portland commuter has an income level somewhat higher than the median income level for the metropolitan area as a whole. It is important to note that the data suggests higher income workers tend to be less receptive to transit than low income workers. Auto ownership is greater among interstate commuters than other Clark County residents. Vehicle registration figures for 1973 indicate that Vancouver households had an average of 1.84 autos. The data presented in table V seems to indicate that auto ownership in the households of commuters is somewhat higher.

CAR POOLS

Only 12% of the respondents indicated they were presently a member of a car pool. About 31% indicated they would be interested in joining a car pool and 49% indicated that they were not interested in a car pool program.

TRANSIT DATA

In order to obtain information pertaining to transit ridership, revenues, fare structures, routes, schedules and equipment

a search of published and unpublished material was made. Sources of information included Oregon State Department of Transportation, the four public carriers operating within the corridor and the CRAG libraries. This data aided in the development of a picture of transit operations and trends within the corridor.

HIGHWAY TRAFFIC DATA

From the Oregon State Highway Division and Washington State Highway Department data relating to traffic volumes, accident experience, roadway geometrics, speed, vehicle occupancy and other information relating to operational characteristics and recent roadway improvements was obtained for I-5, Union and Interstate Avenues. Much of the data was available in reports and files, however, some field studies were conducted specifically for this project. This traffic data provided the basis for evaluating the existing operations and establishing trends in the Interstate Bridge Corridor.

SUMMARY

An examination of various types of data from many sources provide much valuable information which was utilized as the basis of this project.

According to the 1970 Census information a considerable portion of the work force in Clark County work in the State of Oregon and is oriented to Downtown Portland and the northerly industrial areas. The O-D was conducted and the data from it suggested a rather uniform distribution of destinations except for a few locations i.e., Portland CBD and Lloyd Center. The responses relating to transit service, occupancy, income,

ownership, etc., was indicative of a low propensity to use transit. Carpooling did not receive strong support since about one-half of the motorist had no interest therein.

Information on transit and traffic characteristics was readily available from the transit operators in the region and the two state highway agencies.

TABLE I

Person Trips from Clark County (by Auto) to Oregon Destinations

<u>Destination</u>	<u>Work</u>	<u>Non-Work</u>
Downtown Portland	2,020	176
North Portland*	1,936	250
Lloyd Center	1,362	92
Northwest Industrial Area	1,213	24
Southeast Portland	948	84
Swan Island	818	--
Industrial Areas North of Columbia Blvd.	717	76
East Multnomah County	692	25
Washington County	469	--
Southwest Portland (Excluding Downtown)	446	40
St. Johns - Rivergate	410	--
Clackamas County	281	9
External Stations	173	68
Total	<u>11,485</u>	

*Excludes Lloyd Center, Swan Island, Rivergate and Industrial Areas north of Columbia Blvd.

TABLE II

Person Trips by Transit Destinations

from Vancouver to Portland

<u>Destination</u>	<u>Work</u>	<u>Non Work</u>
Downtown Portland	293	39
Lloyd Center Area	22	2
Southwest Portland	6	
Hayden Island	5	
Southeast Portland	4	
Swan Island	4	
Northwest Industrial District	2	
Other	2	
Total	<u>337</u>	<u>43</u>

I-5 INTERSTATE BRIDGE CORRIDOR STUDY

PLEASE DO NOT WRITE IN BOXES

1. Type of Vehicle (check one):
 Passenger car, Pickup or Panel Truck Other
2. How many people were in the vehicle, including the driver? _____
3. Origin of trip (Exact address, nearest intersection or name of well known place where this trip began).
 Address _____
 City _____ State _____ Zip _____
4. Destination of trip (Exact address, nearest intersection or name of well known place where this trip ended).
 Address _____
 City _____ State _____ Zip _____
5. What was the cost of parking at your destination?
 Day Week Month Free
 \$ _____ per _____
6. What was the purpose of this trip?
 Work Personal Business Other (Specify) _____
 School Pickup or deliver passenger
7. Which Interchange did you use to leave the Interstate 5 Freeway?

8. If a fast, efficient and comfortable transit system were available from convenient Park-Ride lots in the Vancouver area to the major employment and business centers in the Portland area would you use transit rather than drive your car in making this same trip?
 Yes No Uncertain
9. Considering the cost by auto, what do you feel would be a reasonable charge for this trip by transit? \$ _____
10. Are you presently a member of a car pool? Yes No
 If you are not now a member of a car pool, would you be interested in joining one? Yes No
11. You are: Male, Female.
12. How many persons reside in your household? _____
13. How many licensed vehicles are available at your household? _____
14. What is your age? _____
15. What is your yearly family income? less than \$3,999 4,000-9,999
 10,000-14,999 15,000-19,999 more than \$20,000

COMMENTS: _____

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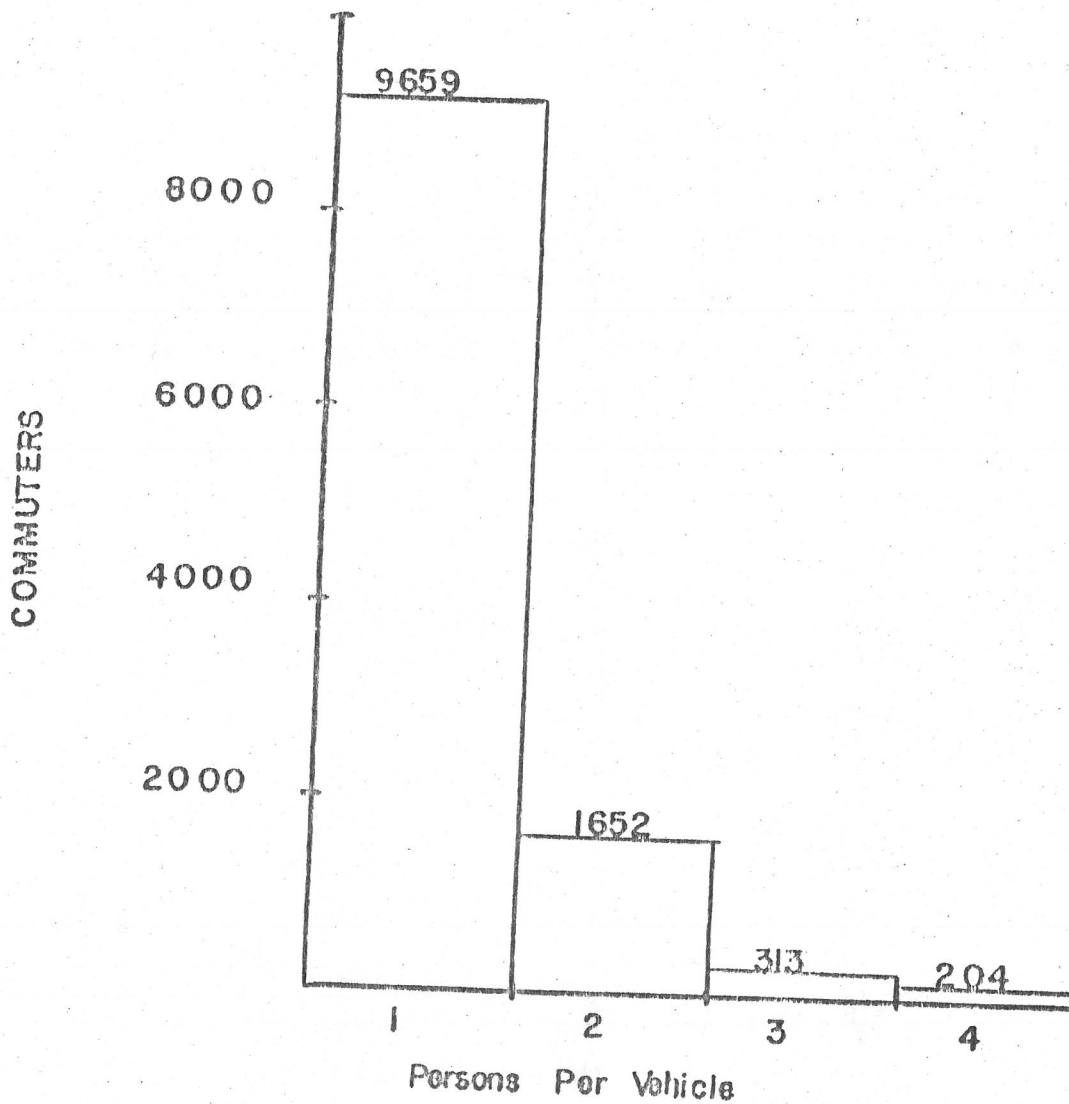
Dir. 1 2

Time 4

Station 2

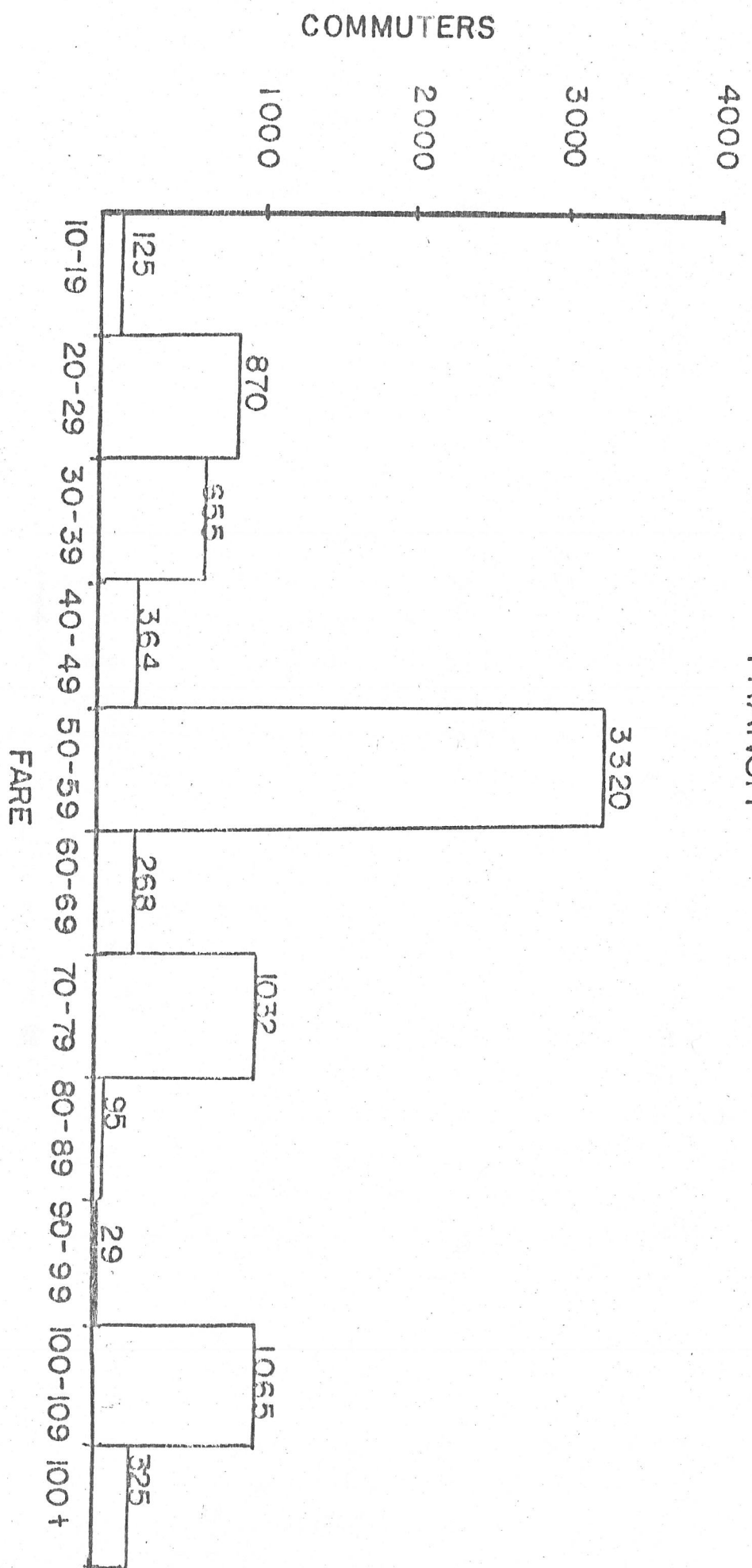
NBR. 8 No 10529

FIGURE IV-2 VEHICLE OCCUPANCY



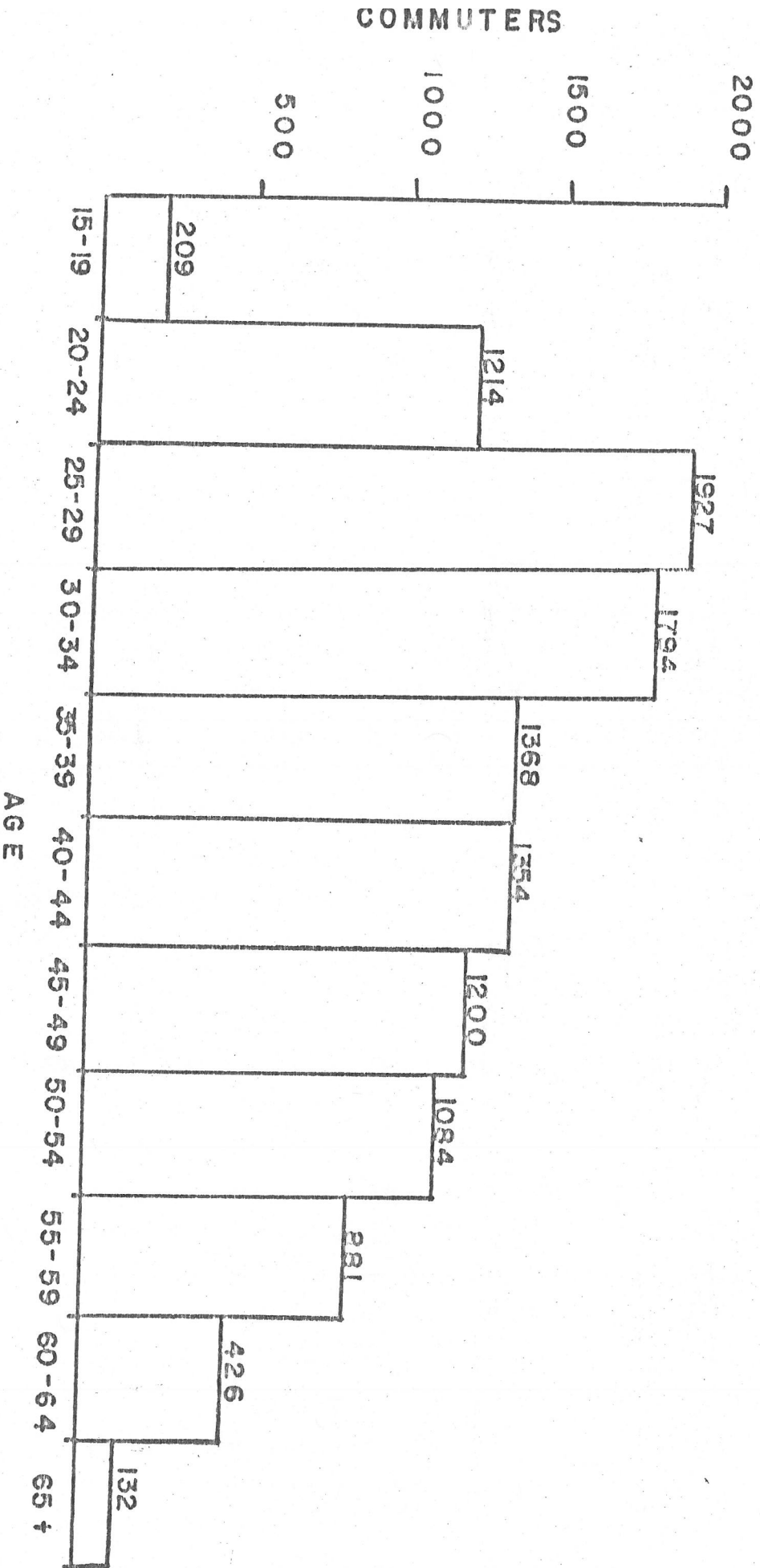
Vehicle Occupancy during the AM Peak Period 1-5
Southbound, Vancouver Washington

FIGURE 14-3
 REASONABLE CHARGE FOR
 TRANSIT



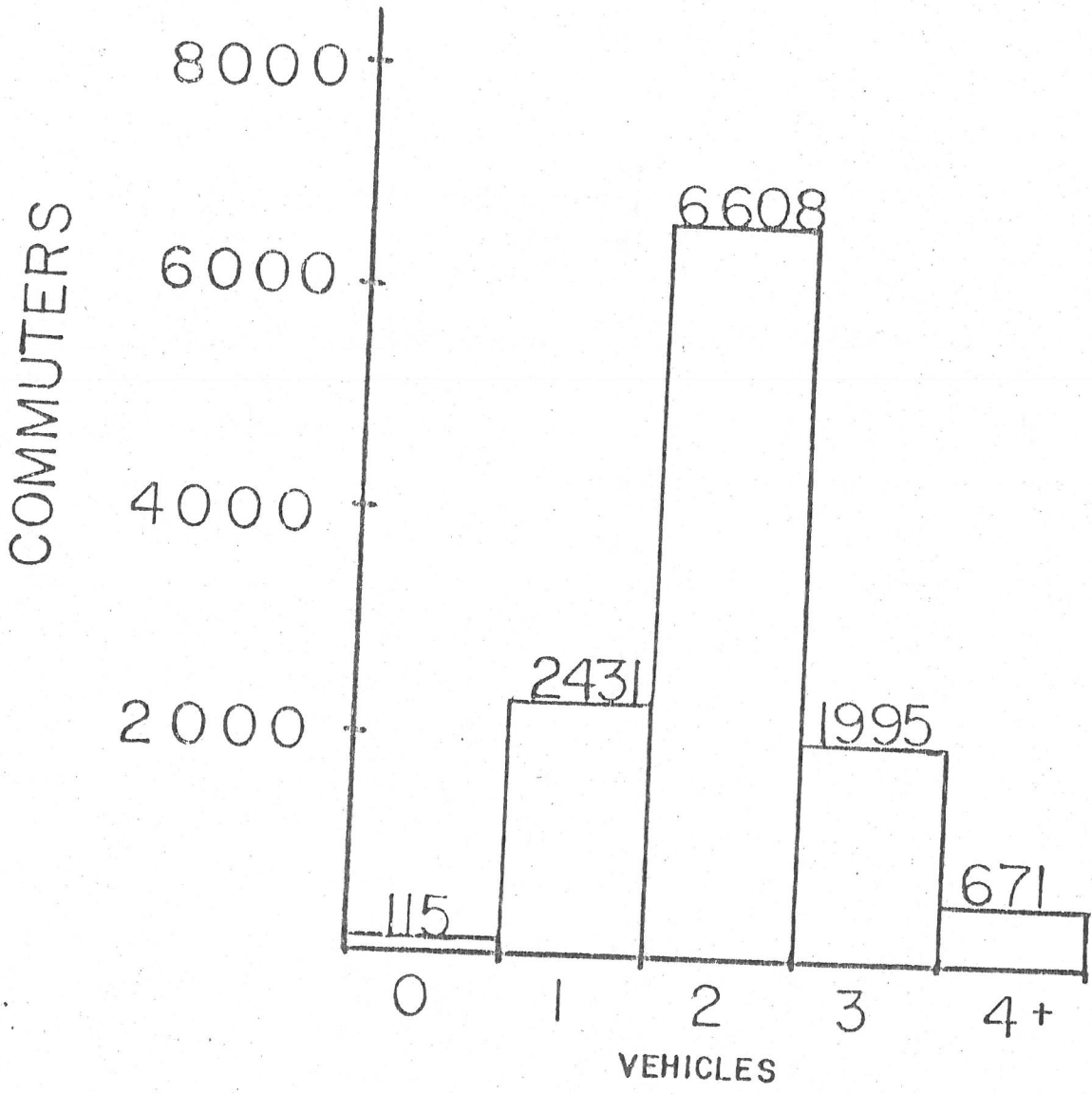
Responses from survey of Southbound Commuters on I-5 during the AM Peak Period in
 Vancouver, Washington

FIGURE 17-4
AGE



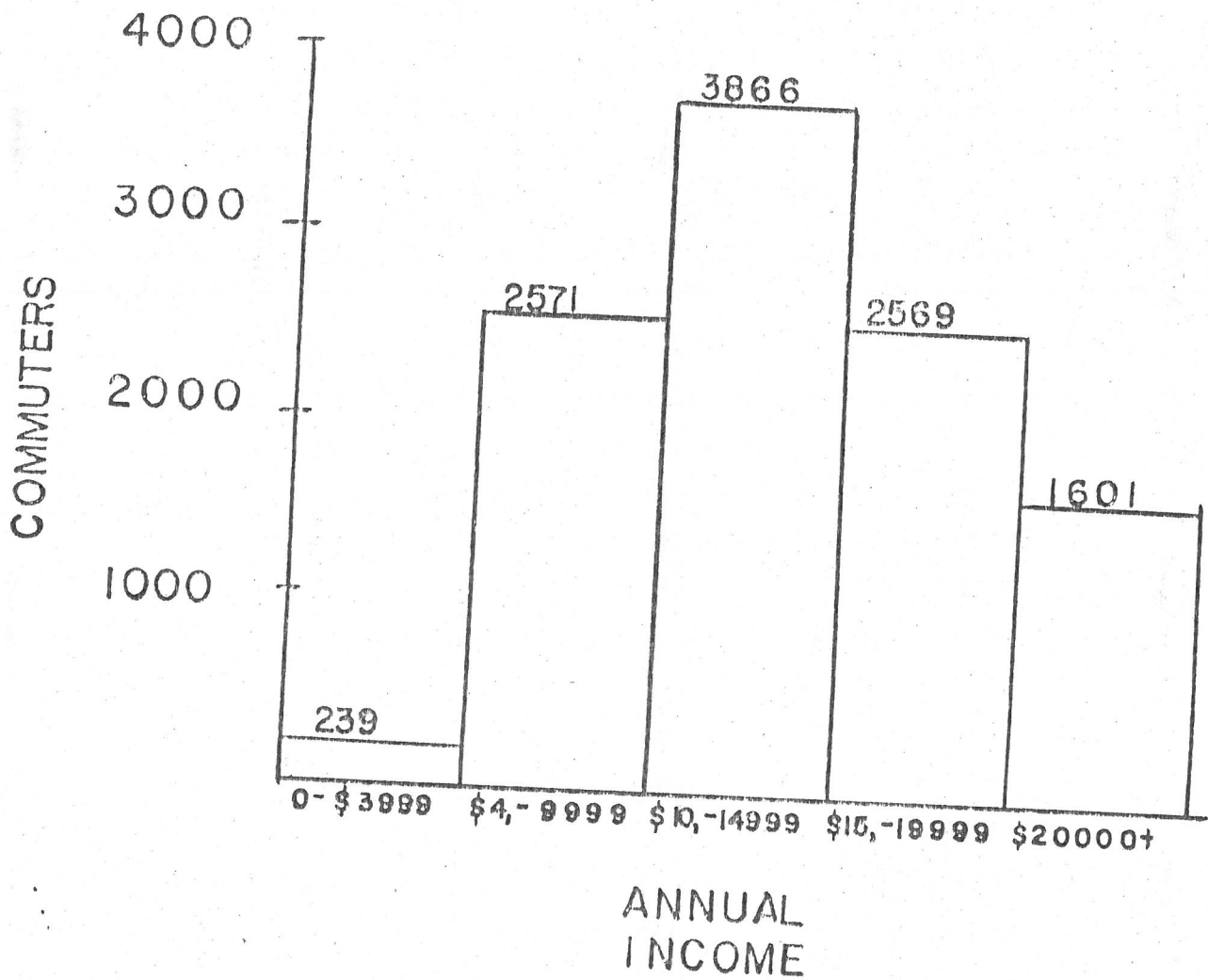
Responses from survey of Southbound Commuters on I-5 in Vancouver
Washington during the AM Peak Period

FIGURE IV-45
VEHICLES AVAILABLE
TO COMMUTERS



Responses from survey of Southbound Commuters on I-5 in Vancouver Washington during the AM Peak Period

FIGURE IV-6 INCOME



Responses from survey of Southbound Commuters on I-5 in Vancouver Washington during the AM Peak Period

PRELIMINARY

General

Presently, transportation in the Portland-Vancouver Region is accomplished by highway, marine, rail, and air systems. Nearly all of the passengers are served by one of three modes - auto, bus or air. Rail systems provide the balance, though small, in passenger service but produces a major movement in goods. Truck and marine deal exclusively in goods movement while air also provides some of this service. The relative passenger service of auto, truck and bus is illustrated on figure V-1.

Within the corridor in question there are four network types available for consideration: namely, highways, rail, marine and air (helicopter). The highway corridor consists of three facilities: I-5, Interstate Avenue and Union Avenue. The rail line in the corridor is used jointly by Burlington Northern, Union Pacific, Amtrak and others. Marine service is accomplished by using the Columbia and Willamette Rivers. Air service is a possibility through the use of helicopter vehicles. This section evaluates the present conditions of these modes and networks. Furthermore, it also explores the trends of the existing conditions.

Highways

I-5 basically consists of four lanes with six on the Interstate Bridge, Hayden Island and south of Portland Avenue. This facility expands to eight lanes south of Going Street and has full (10 feet) shoulders through the project limits except on bridges. Generally, the traffic volumes exceed capacity from 4th Plain Blvd (Vancouver) on the north to Portland Avenue (Portland) on the south. In 1972 the traffic volume at the highest location (near Fremont) was about 86,700 ADT (average daily traffic) while at Delta Parka the ADT was 54,700; Hayden Island - 80,400; and the lowest was 50,400 ADT at Northeast 39th in Vancouver. The demand volume - (maximum service volume) (capacity) relationship is illustrated on figure V-2. In recent years the safety quality has improved with the removal of roadway objects and the installation of concrete median barriers and water-cell impact devices at many off ramp gores. An indicator of the improved safety conditions is ill-

ustrated by the reduction in the accident rate which decreased to 1.81/MMM (accidents/million vehicle miles) in 1972. The trend has persisted inspite of an increase in traffic volumes. However, in Vancouver the outdated ramp design contributes to extremely high accident rates. At one location the rate was near 50 ACC/MV in 1970 while other similiar ramps in the state were approximately 6 ACC/MV. The profile alignment is considered level except on the Interstate Bridge and in the vicinity of Mill Plain Blvd in (Vancouver) which sections have significant grades as to causing lower operating speeds for heavy vehicles. Perhaps of major concern of I-5 and the total corridor is the Interstate Bridge because it is a drawbridge with marine traffic ^{right of way} and the only highway link across the Columbia River within 40 miles in either direction. The high traffic volumes cause queuing problems when the drawspans are open or an accident occurs during heavy traffic flow. At times the queues have extended ^{for} miles on the freeway, and blocked street networks in downtown Vancouver and Hayden Island. This bridge has been of considerable interest and concern for sometime. To provide a warning to motorists approaching congestion the Washington State Highway Department operates the "Advance Warning System" which detects slow moving vehicles and activates warning signs. In Oregon there are signs interconnected with the draw bridge controls for the same purpose.

Aside from the Interstate Bridge specific problem areas include three in the northbound direction; namely, Going St. off-ramp, Portland Blvd. off-ramp and Union St. on-ramp. Frequently, in the morning northbound traffic exiting at Going St. and Portland Blvd. back up onto the freeway and, thereby, partially blocking it. In the evening, the geometrics of the successive merges of Union Avenue and Swift Street and I-5 and Union Avenue produces slow traffic operational speeds. Many of the motorists entering Union Avenue do not merge with Union Avenue traffic until after they enter I-5, thereby, causing confusion and slow movement.

Prior to the construction of I-5, Interstate Avenue was a portion of the major national north-south highway near the west coast. Through north Portland it generally consisted of four lanes with parking and raised channelization in the median. The traffic volumes may be considered light to moderate since the ADT does not exceed 8,000 ADT except south of Greely Avenue. Near Fremont St. the volume increases to 16,000 ADT based on 1972 volume studies. The safety aspects do not compare favorably with the freeway but considering the light volumes, the median and the adjacent land use which has low traffic flow frictional characteristics the safety quality does merit worthy mention. The accident rate has been decreasing in recent years and in 1972 was 4.07 A/MVM. The geometrical alignment is good except near Going Street and Greely Avenue. Since this was a national route, the roadway pavement is of good quality.

Union Avenue likewise consists of four lanes with parking, except south of Hancock Street where it couplets with Grand Avenue. Generally, there is not a capacity problem but near Fremont the volume exceeds 19,000 ADT in 1972 but elsewhere, north of the couplet, it did not exceed 11,000 ADT. Because of narrow lanes and roadway, considerable business activity along the street (causing traffic flow friction), lack of median barrier, there prevails a lower quality in safety as indicated by accident rate of 6.26 A/MVM. Alignment of this facility, except for the one-way couplet transitions, is very good.

Mass Transit

There are five passenger carriers locally serving the I-5 corridor. Four use buses; namely, Tri-Met (Public), Vancouver-Portland Bus Company (Private), Evergreen Stage Lines (Private), and Vancouver Transit (Public). The fifth carrier is Amtrak,

a public rail operation, which does not provide commuter service. Most (about 95%) of transit trips are by bus; however, there exists several disincentives against bus transit in this corridor. Presently there is no coordination of routes, lines and schedules among the several transit operators (an exception is between Vancouver - Portland Bus Company and Vancouver Transit, which provide reasonable interfacing of lines and schedules at 5th & Broadway); common line designation among different carriers is also non-existent and each carrier maintains separate fare with no provision for transfer between systems. (Note: Tri-Met and Vancouver-Portland Bus recently agreed to honor transfers between each other with their Hayden Island lines.) Of course, the issue of mixing public and services requires special attention since private interests operate and expand on revenues from the fare box in contrast to public systems which can obtain tax revenues to offset deficiencies which may occur. To illustrate this issue, a Vancouver resident will pay approximately \$2.40 for round trip to the St. Johns industrial area, ride three carriers each way, transfer four times during a round trip, wait up to 20 minutes at the transfer points and perhaps have a ten minute walk at each trip end. This partially explains why the modal split at the Interstate Bridge was only 1%.

According to another report the freight rail traffic is so great on the present rail bridge that significant passenger service does not appear possible without disrupting freight service. The Amtrak terminal in Vancouver is located away from employment or residential centers. Therefore, essentially all Amtrak passengers need a feeder system; However, at present Vancouver Transit System does not serve the depot area.

Marine Passenger service is available only on a charter basis. At present there is not adequate bus transit service to areas which may be used as marine passenger ports; therefore, this mode would have a small service area without expanded bus service. Other limitations on marine systems include an indirect route requiring nearly twice the travel distance from downtown Vancouver to Portland although it may be a feasible alternative. Generally, air service is not available but helicopter vehicles may be leased. Some other regions do have helicopter passenger service operating but with high operation costs and relatively short distances where the high speed and direct route is of little advantage. This possibility does not appear to be a feasible alternative.

Movement of Goods

The major modes for freight movement within this corridor consist of truck, rail, marine and some by private bus. In fact first three concentrate on this service. The trucks use Interstate highway facilities, the trains of several companies utilize the same rail line while marine, of course, use the rivers which have been dredged to accommodate ocean boatcraft. Deep water ports have been provided at Portland, Swan Island and Vancouver ports. The marine and rail vehicles have a much greater terminal tie in contrast to trucks; therefore, the relatively short commodity trips between Portland and Vancouver are predominately provided by the truck mode. The trips of commerce outside the region are, obviously, more likely to be rail and marine than the intra-regional trips.

Trends

Existing trends are best treated by comparing passenger service by auto, bus and rail since these are the only transportation modes which have varied significantly in relation to each other.

During the decades of the 50's and 60's the Portland transit service lost 2/3 of the ridership (~~figure~~ ^{during which}). At the same time highway traffic was increasing as shown on figure V-4. The rail passenger ridership declined to insignificant levels almost a half century ago. There are numerous ways to explain this trend of reduced ridership:

1. Dispersal of urban development (Sprawl).
2. Low cost and mass production of passenger cars.
3. The advent of the urban commuter.
4. Extensive highway network construction connecting essentially all cities and towns.
5. Availability of inexpensive fuel.
6. The construction of urban freeways.
7. Established transit institutions unable to accommodate sufficient change.
8. Deterioration of equipment and facilities for mass transit.
9. Lack of route & schedule flexibility.

However, in recent years the trend has changed in ridership with the dawning of public transit organizations which are partially supported by sources other than fare box revenues. This movement has also resulted in higher operational cost because of providing service with low ridership. The present condition of obtaining fuel has provided the biggest inflation of transit ridership in recent history. Tri-Met records include an increase of 30% for February over February figures of a year ago, while Vancouver-Portland Bus Company experienced an increase of _____. Present publications suggest that fossil fuel consumption will continue to be reduced or at least moderated as compared with the past. In recent years several land use, network and transportation characteristics have been evaluated to explain various inter-relationships within the Portland region. Among these relationships are residential density, income, auto ownership, traffic volumes and accessibility (expressed in travel time). These relationships have been illustrated on figures V-5, 6, 7, & 8. Briefly, they may be explained as follows:

1. Transit trips increase with residential density.
2. Transit trips decrease as income increases.
3. Transit trips decrease as auto ownerships increase.
4. Transit trips decrease with transit travel time.
5. Peak period traffic ratio to ADT decreases as ADT increases.
6. In addition to the above, transit trips increase with ~~auto-fuel cost~~ *reduction in auto fuel availability*.
7. Extending 1972 traffic volume growth rates to 1990 the Columbia River screening will be overloaded even with the new I-205 bridge.

An examination of these trends can provide possibilities for modifying the urban system in such a manner the policies or action not directly related to transportation may have considerable impact on transportation. As an example, a considerable reduction in purchasing power may reduce auto ownership and there could be an increase in transit ridership.

Along with the heretofore mentioned are other trends and issues which need consideration and treatment. While carpooling does not directly aid transit, in fact it may reduce potential or existing transit usage, it is desirable because it reduces highway congestion, pollution, etc. Tri-Met has even provided financial support to a regional carpooling effort. The availability of transit equipment is becoming a serious problem because of recent emphasis on transit systems. Equipment costs are expected to increase substantially as the demand increases.

Summary

Evaluating the present conditions of the transportation systems within the Interstate Bridge Corridor suggested that there is nearly an exclusive reliance on the highway mode of traffic which has developed the under^{er}able problems of congestion - noise & air pollution, delay, etc. This is true inspite of major capital projects developed to reduce or prevent these problems because of the rapid growth of auto trips at the same time transit ridership was decreasing (until recently).

Table V HIGHWAY VOLUME - CAPACITY RELATIONSHIPS IN THE INTERSTATE BRIDGE CAPACITY

FACILITY NUMBER OF LANES

I-5

	FREEMONT	9	2,700	100,000
	KILPATRICK	6	13,800	75,000
*	COLUMBIA	4	5,400	50,000
*	INTERSTATE BRIDGE	6	77,800	75,000
	McLORAIN	4	53,600	50,000

INTERSTATE

	FREEMONT	4	16,700	20,000
	VALLEY VIEW	4	6,000	20,000
	COLUMBIA	4	7,300	20,000

UNION

	FREEMONT	3	11,100	30,000
	KILPATRICK	4	15,800	20,000
	COLUMBIA	4	12,300	20,000

SCREENLINE

	FREEMONT		122,500	150,000
	KILPATRICK		93,400	115,000
	COLUMBIA		74,900	10,000
*	INTERSTATE BRIDGE		11,800	75,000

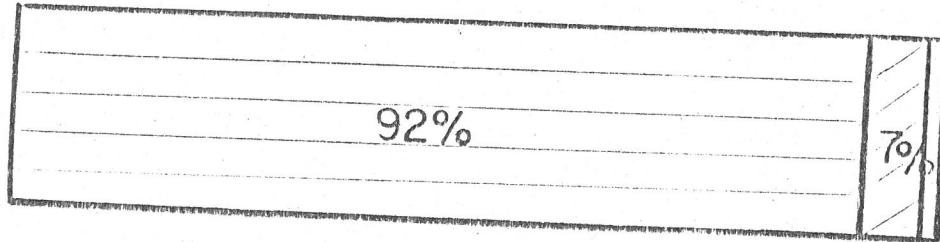
* DEMAND EXCEEDED CAPACITY - SERVICE INSUFFICIENT

<u>Hour Ending</u>	<u>Direction & Queue Length (miles)</u>	<u>Clear time (minutes)</u>
7:00 A.M.	.8 North	12.3
8:00 A.M.	2.8 North	47.3
9:00 A.M.	1.0 North	13.4
4:00 P.M.	1.0 South	14.3
5:00 P.M.	2.8 South	47.3
6:00 P.M.	2.1 South	28.8
7:00 P.M.	0.8 South	12.3

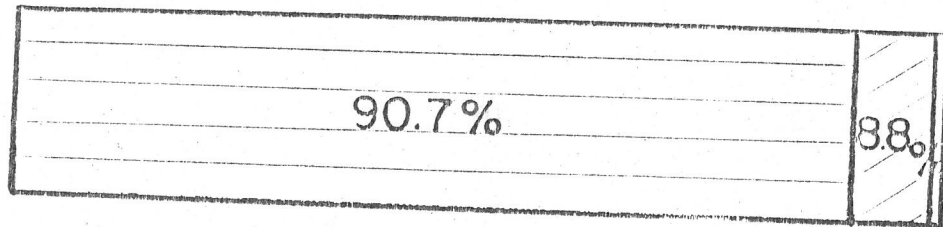
TABLE ^{V-2} -- ESTIMATED QUEUE LENGTH AND TIME TO CLEAR CONGESTION ON INTERSTATE 5. IN THE VICINITY OF THE INTERSTATE BRIDGE

TRAVEL RIDERSHIP

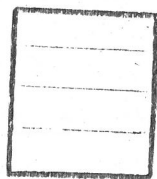
PERSON TRIPS PER DAY (100,000)



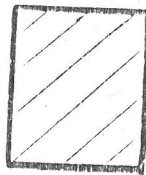
AVERAGE DAILY TRAFFIC
VEHICLES PER DAY (78,000)



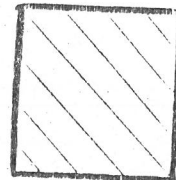
Legend (Train and Marine were insignificant)



AUTO



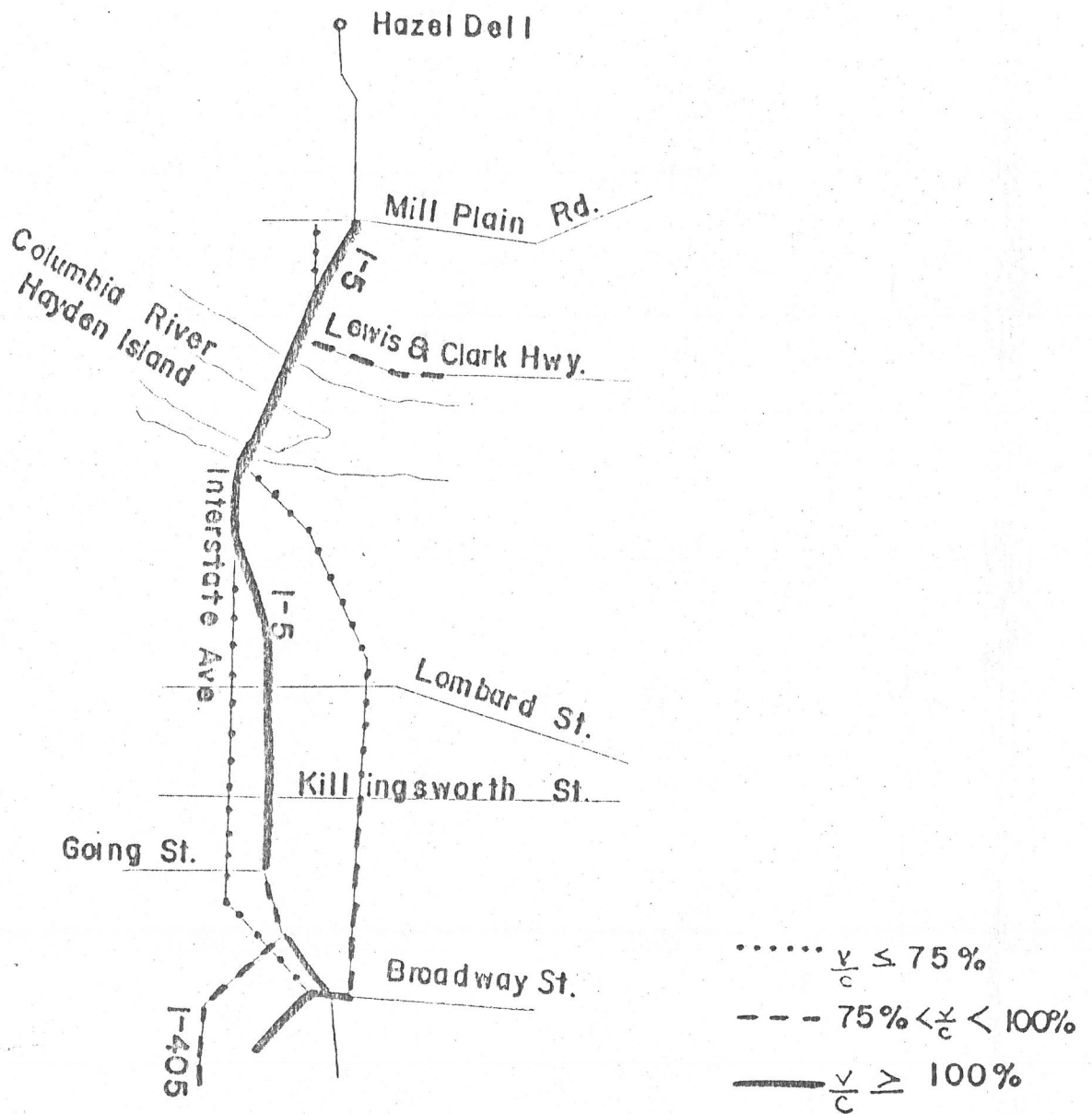
TRUCK



BUS

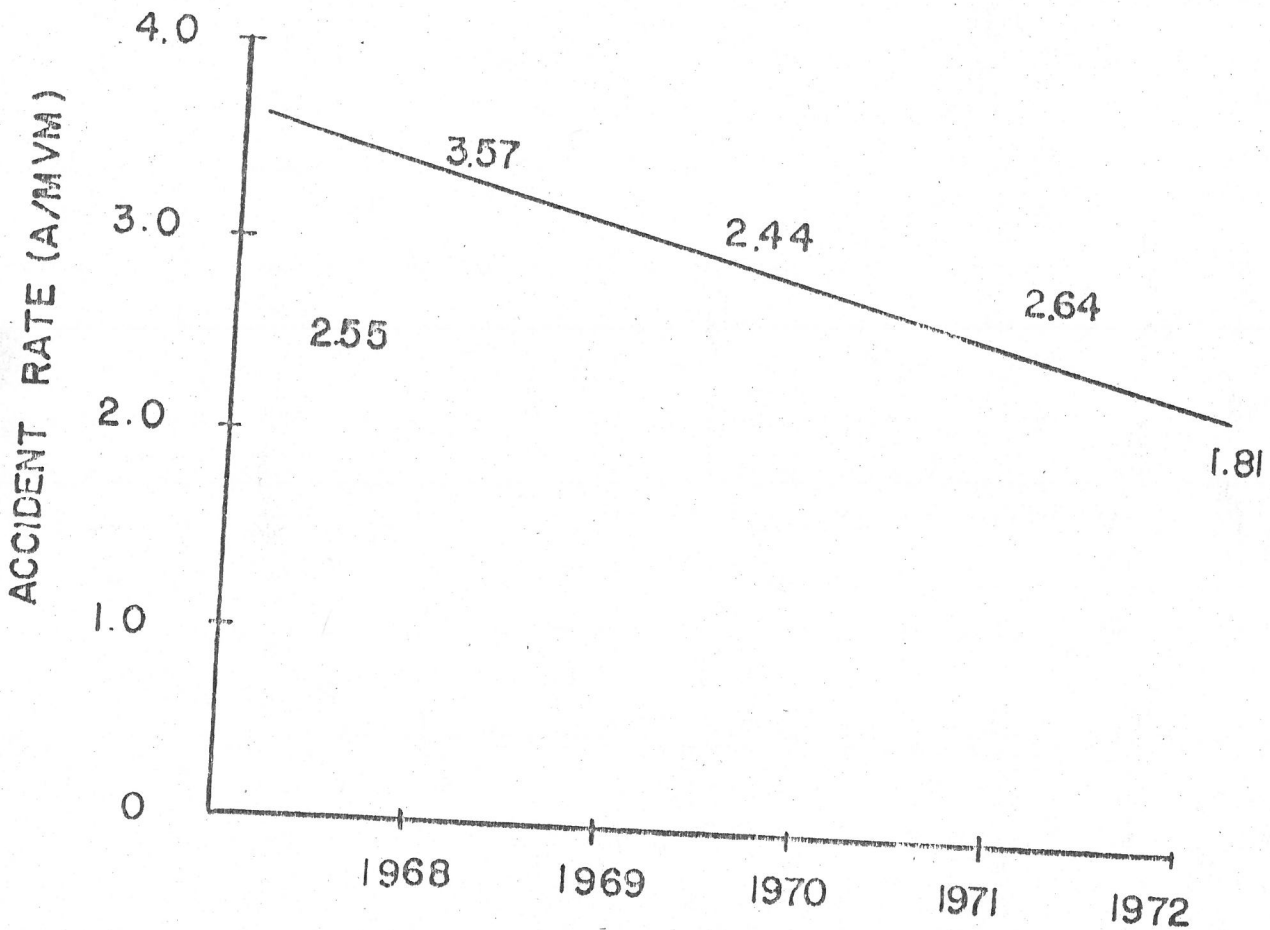
MODAL SPLIT CHARACTERISTICS OF
COLUMBIA RIVER SCREENLINE (1972)

FIGURE V-2
 DEMAND CAPACITY OF HIGHWAYS IN
 THE INTERSTATE CORRIDOR



$\frac{v}{c}$ - Peak Period Auto Trips Compared To Design Capacity

Accident Rate Trend Within the City of Portland



YEAR
1-5 ACCIDENT RATE TREND
WITHIN THE CITY OF PORTLAND

FIGURE V-4

AUTO AND TRANSIT TRIP TRENDS IN THE PORTLAND AREA

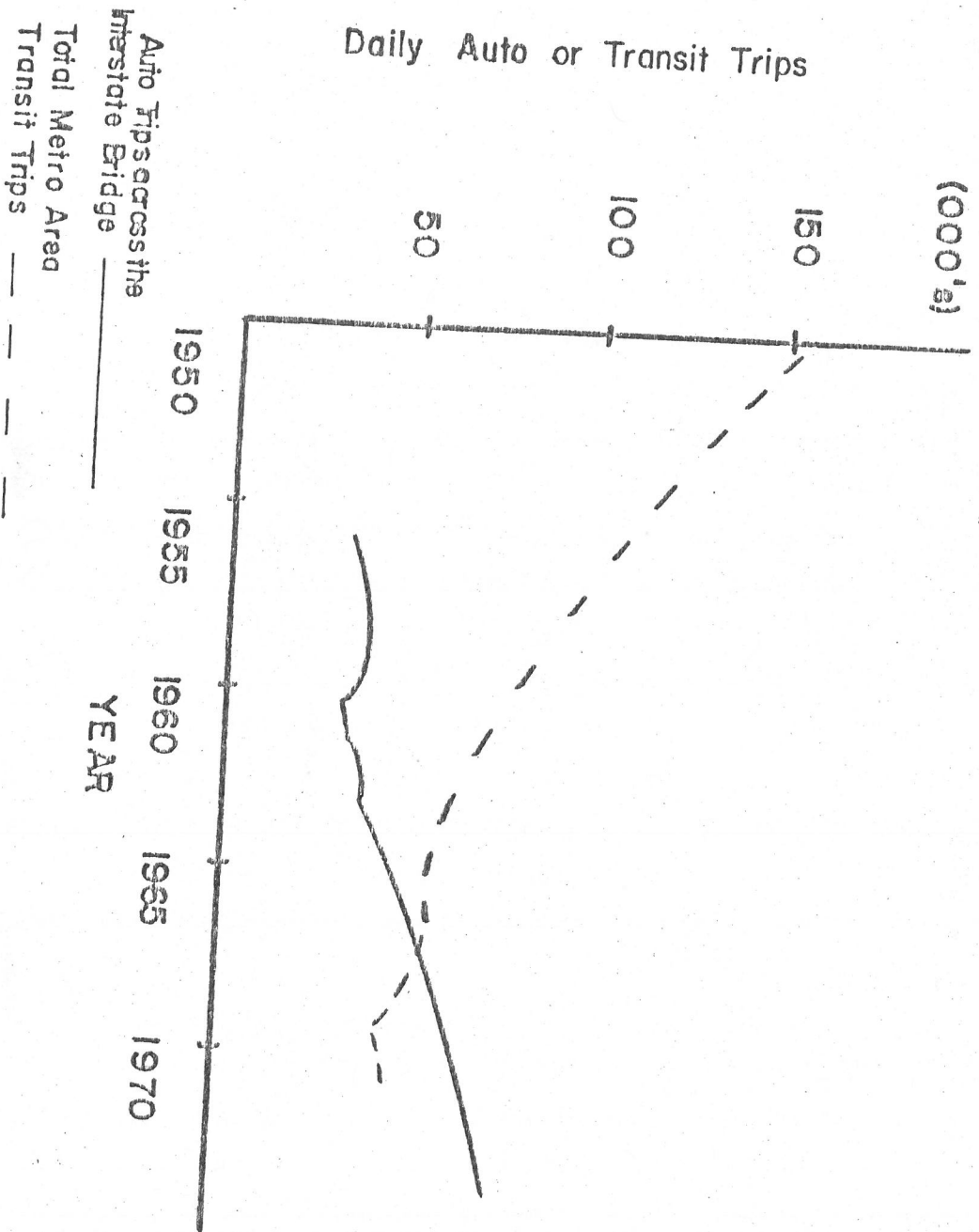


FIGURE V-5

Effect of Density on Modal Split

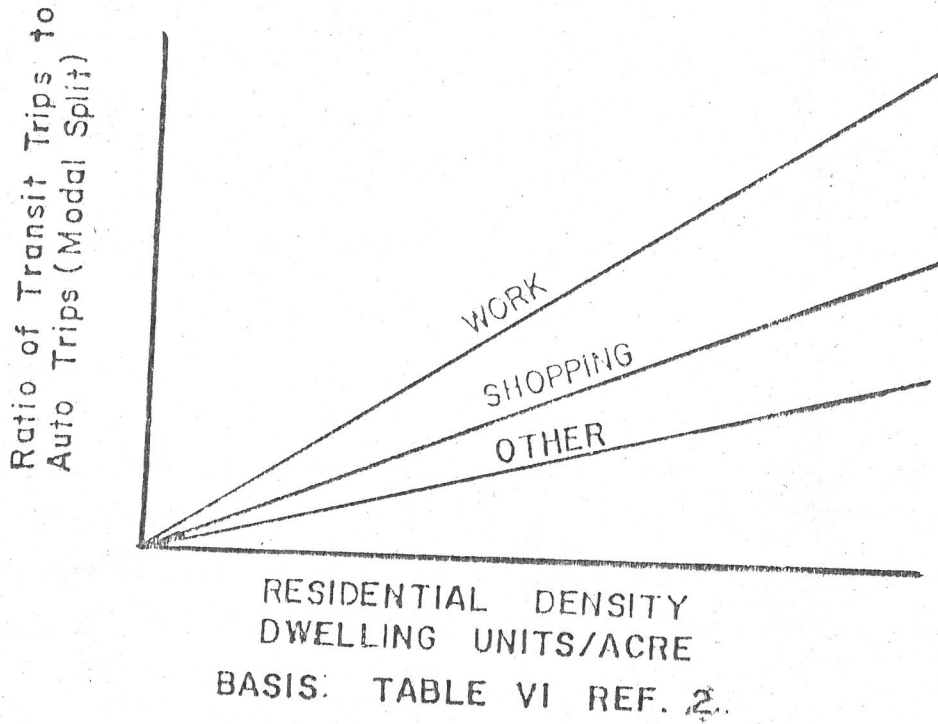


FIGURE V-6

Effect of Income on Modal Split

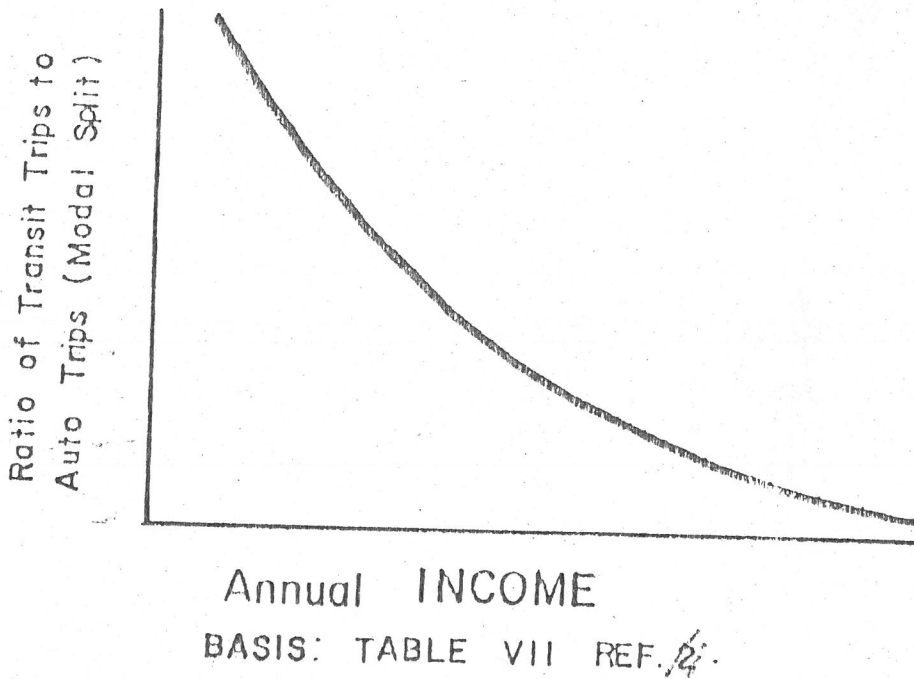
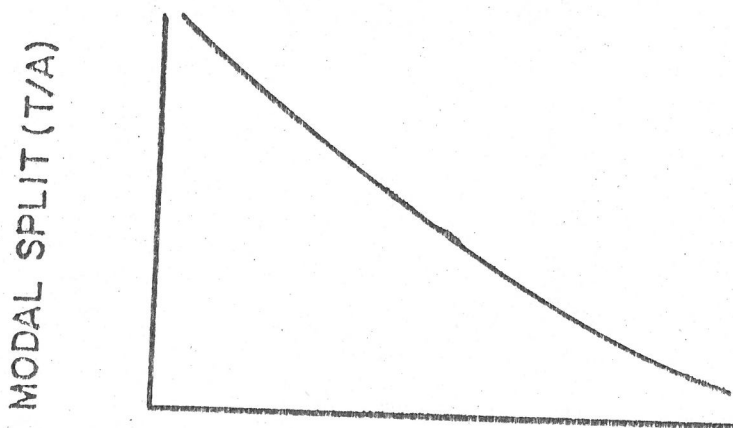


FIGURE V-7

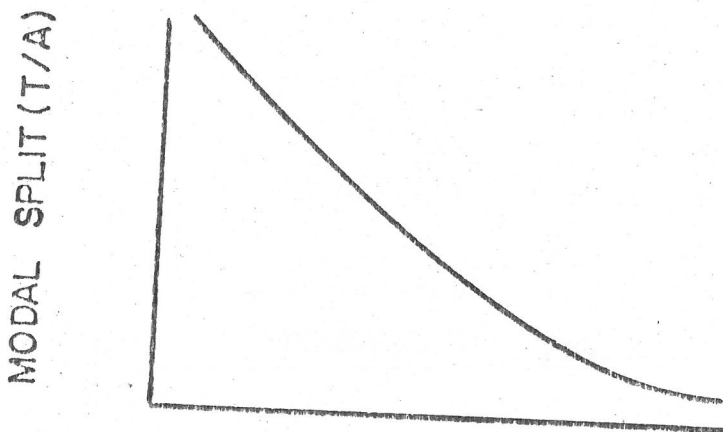
AUTO OWNERSHIP vs MODAL SPLIT



AUTO OWNERSHIP (RATE)
BASIS: TABLE VIII REF. 2

FIGURE V-8

ACCESSIBILITY vs MODAL SPLIT



ACCESSIBILITY RATIO
AUTO/TRANSIT TRAVEL TIME
BASIS: TABLE X REF. 2

PRELIMINARY

Major public transportation (mass transit) service in the Interstate Bridge Corridor is presently provided by a combination of publicly and privately owned transit systems. These systems include:

1. Tri County Metropolitan Transportation District of Oregon (Tri-Met) - Public
2. Vancouver Transit System - Public
3. Vancouver-Portland Bus Company - Private
4. Evergreen Stage Line - Private

This section of the report describes the existing Oregon and Washington enabling legislation regarding the establishment and an operation of publicly-owned mass transit systems. It also describes the authority under which the private carriers operate in the project area as granted by the Interstate Commerce Commission, the Washington Utilities and Transportation Commission and the Public Utility Commissioner of Oregon. Regulatory restraints to service improvements will also be identified.

Oregon Existing Enabling Legislation - Chapter 267 of Oregon Revised Statutes authorizes the creation of a mass transit district encompassing every Oregon county in any standard metropolitan statistical area for the purpose of providing a mass transit system for the people of the district. Mass transit districts established under this authority are governed by a seven member board of directors appointed by the Governor. A district has full power to carry out its purpose AND MAY:

Have and use a seal, have perpetual succession, and sue and be sued in its own name. Acquire by condemnation, purchase, lease, devise, gift, or voluntary grant real and personal property or any interest therein, located inside the boundaries of the district and take, hold, possess and dispose of real and personal property

purchased or leased from, or donated by, the United States, or any state, territory, county, city or other public body, nonprofit corporation or person for the purpose of providing or operating a mass transit system in the district and aiding in the objects of the district.

Contract with the United States or with any county, city, state or public body, or any of their departments or agencies, or a non-profit corporation, for the construction, acquisition, purchase, lease, preservation, improvement, operation or maintenance of any mass transit system.

Build, construct, purchase, lease, improve, operate and maintain, subject to other applicable provisions of law, all improvements, facilities or equipment necessary or desirable for the mass transit system of the district.

Enter into contracts and employ agents, engineers, attorneys and other persons and fix their compensation.

Fix and collect charges for the use of the transit system and other district facilities.

Construct, acquire, maintain and operate passenger terminal facilities and motor vehicle parking facilities in connection with the mass transit system within the district.

Perform such other function or acts or things as may be necessary or convenient for the proper exercise of the powers granted to a district by Chapter 267-ORS.

Transit districts are authorized to finance the construction acquisition, purchase, lease, operation and maintenance of a mass transit system.

Financing of the system may be accomplished by one or any combination of the following methods:

1. Ad valorem (Property) taxes
2. User charges
3. General obligation bonds
4. Business license fees
5. Income tax
6. Retail sales tax
7. Employer payroll tax
8. Highway user taxes to urban areas

Tri-Met was established under Chapter 267-ORS and currently employs two of the available financing methods. These are the user charges (fares) and the employer payroll tax. The present service area of Tri-Met consists of the three Oregon counties within the standard metropolitan statistical area which include Clackamas, Multnomah, and Washington Counties. Tri-Met does not provide service within the project area which significantly affects interstate traffic on the Interstate 5 facility. However, effective April 1, 1974, Tri Met extended its Union Avenue Line, Route 6, under authority granted by Chapter 267-ORS, from its furthestmost point on Union Avenue at Lombard Street north to the Jantzen Beach Shopping Complex on Hayden Island. This extension of service is expected to serve part of a large number of trips made between the Portland area and Jantzen Beach. In addition on April 1, 1974, Tri-Met and the privately owned Vancouver-Portland Bus Company began honoring each others transfers for trips destined to or originating from Jantzen Beach on the Vancouver-Portland Bus Company line. This agreement opens up a larger service area for public trans-

portation to Jantzen Beach and is expected to slightly impact private automobile travel in the corridor.

House Bill 2170 of the 1973 Oregon Legislative Assembly amended Chapter 267-ORS authorizing transit districts established under that chapter to enter into contracts for mass transit services with local governments in Oregon, inside or outside the district, or with the State of Washington or public agencies of the State. Specifically, this legislation authorized Oregon mass transit districts to: "Enter into contracts under ORS chapter 190 with units of local government of the State of Oregon, whether within or without the district, or with the State of Washington or with public agencies of the State of Washington, to act jointly or in cooperation with them or to provide mass transit services to areas under their jurisdictions, provided that the party contracting to receive the services shall pay to the mass transit district not less than the proportionate share of the cost of the services that the benefits to the contracting party bear to the total benefits from the service."

There exists no enabling legislation in Washington which would allow Oregon mass transit districts to enter into contracts to provide service between Oregon and Clark County, Washington.

Washington Existing Enabling Legislation

The City of Vancouver is authorized to operate a transit system within the city limits under Revised Code of Washington (R.C.W.) 35.92 and 35.95. It is also authorized, by adoption of a city ordinance, to levy a utility tax to finance the system. Clark County, however, is not authorized to operate transit systems under existing legislation. The county may, however, enter into an agreement with the City of Vancouver to operate bus service in the county under

R.C.W. 39.34. Such service may not duplicate nor conflict with service authorized by the Washington Utilities and Transportation Commission under certificates of public convenience and necessity.

R.C.W. 35.58 authorizes the formation of a Municipal Metropolitan Corporation (Metro) in areas of the state of Washington containing two or more cities, one of which must be a first class city. Mass transit service is but one of the functions which can be provided by a Metro. The City of Vancouver and Clark County alone could not form a Metro, but it could be accomplished by including another city. A Metro established under R.C.W. 35.58 could not include any territory in Oregon and can only be created by a vote of the qualified electors in the proposed service area.

The City of Vancouver and mass transit districts in Oregon may enter into contracts to provide transit service under R.C.W. 35.95 and the 1973 amendment to Chapter 267-ORS. However, this authority does not enable Clark County to enter into a contract for transit service with Oregon mass transit districts. Under R.C.W. 35.95 and 39.34 Vancouver could contract with Clark County and other cities in the county to provide transit service in and between those jurisdictions. This still does not provide a mechanism for providing interstate transit service between Washington and Oregon.

Interstate Commerce Commission

There are two privately owned and operated transit companies which provide interstate mass transit service in the Portland-Vancouver Metropolitan area. These are the Vancouver-Portland Bus Company and the Evergreen Stage Line. Both carriers hold Certificates of Public Convenience and Necessity issued by the Interstate Commerce Commission (ICC) to provide interstate passenger service.

The Vancouver-Portland Bus Company is authorized to provide interstate transportation of passengers over regular routes between Portland, Oregon and Vancouver, Washington. It cannot provide service from the Camas-Washougal area or unincorporated areas of Clark County beyond four miles of the Vancouver city limits (ICC Commercial Zone ruling). Interstate service to and from intermediate points is also authorized. The Vancouver-Portland Bus Company currently provides the majority of interstate mass transit service between Portland and Vancouver.

The Evergreen Stage Line provides regular route passenger service between Portland and such cities in Clark County as Battle Ground, Camas, Washougal and Vancouver and is authorized to serve intermediate points in between these areas. It does not hold any authority to provide intrastate service within Oregon. This carrier, however, provides only a limited amount of service in the Interstate Bridge Corridor and this is not oriented towards peak hour commute trips.

Washington Utilities and Transportation Commission (WUTC)

The Vancouver-Portland Bus Company does not hold any intrastate regular route authority from the Washington Utilities and Transportation Commission to conduct intrastate regular route operations. Therefore, this carrier is limited to interstate regular route passenger service from the Vancouver area to Portland and intrastate service in Oregon as described later in this report.

The Evergreen Stage Line holds operating authority from the WUTC to provide intrastate passenger service in the Vancouver-Clark County area. Service is authorized between Vancouver and areas such as Battle Ground, Camas, Washougal, Battle Ground Lake, Heisson and Yacolt including intermediate points. This authority together with ICC interstate authority provides the greatest areal coverage

of Clark County with intrastate and interstate operations.

Public Utility Commissioner of Oregon (PUC)

Intrastate public transportation service as authorized by the PUC on the Oregon side of the Interstate Bridge Corridor is provided by the Vancouver-Portland Bus Company. The Evergreen Stage Line, although it provides interstate and intra-Washington service in the corridor, holds no authority from the Public Utility Commissioner of Oregon to conduct intrastate operations.

The Vancouver-Portland Bus Company conducts intrastate operations from points north of Denver Avenue including Jantzen Beach, to points on its regular routes to downtown Portland. Until April 1, 1974, this carrier provided the only mass transit service to Jantzen Beach. As a result of many requests from citizens, Tri-Met extended its Union Avenue Line, Route 6, from its previous terminal at Union Avenue and Lombard Street to the Jantzen Beach Shopping Center on April 1, 1974.

Conclusion

A preliminary review of state enabling legislation in Oregon and Washington and an analysis of regulatory restraints to public transportation indicate several difficulties restrain transportation improvements in the I-5 corridor. While four individual transit systems presently serve some portion of the travel demand in the corridor, there exists no single system or even a combination of systems which could efficiently serve both the intrastate and interstate travel demand. If public transportation is to attract a larger portion of the travel demand in the corridor, there must be a unified and coordinated system which will enable Washington and Oregon residents to use the system freely, conveniently, and at a low cost. Many economies can be realized and more attractive service can be provided by transporting both intrastate and interstate passengers on the same vehicle within a single system. In addition, many operational problems involving coordination of schedules, routes, fares, transfers, etc. can be eliminated by having a single system serving a given area. Some coordination of separate systems can be accomplished however, but sufficient energies and resources must be committed to accomplish this task.

Experience in this country has shown that while coordination between systems is possible, this arrangement never achieves the same degree of success as a single unified system. The public interest can best be served by providing a transit system which eliminates all possible barriers which deter use of the system.

Following is a list of possible alternatives which should be pursued to address both temporary and permanent solutions to public transportation in the corridor.

1. The City of Vancouver and Clark County could enter into a contractual arrangement to provide service from both the city and certain areas of the county. Interstate passengers would be transported to the Vancouver transit station where an inexpensive transfer could be made to the Vancouver-Portland Bus Company for travel to areas in Portland. Both intrastate and interstate passengers would be transported on the same service.
2. Additional operating authority (temporary or permanent) could be granted to the Vancouver-Portland Bus Company to provide both intrastate and interstate service to Vancouver and Clark County residents within the Vancouver commercial zone. This carrier is currently authorized to conduct interstate operations between Vancouver and Portland and can serve that portion of Clark County which lies within four miles of the Vancouver city limits.
3. Legislation by the State of Washington could be sought enabling Vancouver and Clark County to establish a county-wide transit system. This legislation would authorize transit service throughout the county or within a specified service area. This legislation should also authorize the county-wide systems to contract with public or private systems for providing service between the county and the Portland, Oregon area. Such area in Oregon should cover the service area of the Tri-County Metropolitan Transportation District of Oregon. Financing of the county wide system would also be provided for in the legislation.*

* SIMILAR LEGISLATION WAS PASSED BY THE WASHINGTON LEGISLATURE IN APRIL, 1974.

4. The States of Oregon and Washington could pass joint legislation calling for the creation of a bi-state mass transit district within the counties of Clackamas, Multnomah and Washington in the State of Oregon and Clark County in the State of Washington. The district would have such powers as generally held by the Tri-County Metropolitan Transportation District of Oregon. The district could provide mass transit service within and between each of the four counties comprising the district. The Legislation should, however, authorize the district's governing body to define a service area that is benefited by mass transit service beyond the general benefit of all territory within the district. A uniform method(s) of financing the mass transit system throughout the district should be provided. Representation on the district's governing body would be provided throughout the four county area.

In terms of providing attractive, convenient and uniform service to all residents throughout the Portland-Vancouver metropolitan area, a bi-state transit district as identified in item 4 can best serve the transportation needs in the region, as well as in the corridor. However, while this preliminary analysis of legal and legislative problems confronting transportation in the corridor indicate a bi-state transit agency can best serve this need, it is recommended that a decision on the establishment of such a district await the results of Phase II of the Interstate Bridge Corridor Project. The complexities involved in obtaining bi-state legislation indicate that this type of legislation could not be obtained in time to enable Phase I immediate improvements in public transportation to be implemented in the corridor. Action by the U.S. Congress may also be necessary.

An extensive search was made in order to consider all reasonable possibilities for transportation improvement within the Interstate Bridge Corridor Project. Possible improvements included measures from low to high cost and minor to major in scope. For convenience and clarity these potential improvements have been categorized into four types: Transit operation, socio-economic, highway operations and innovative system.

TRANSIT OPERATIONS

Improvements in transit operations may be, in nature and impact minor, major or any level between those extremes. To provide a systematic method of presentation, the potential improvements were grouped into these five categories - ^{improved} expanded bus service, exclusive transit roadway, expanded express bus service, interface facilities for parking and transferring and rail passenger service and are explained below. These categories are not completely independent as the express buses often operate on exclusive lanes; therefore, any improvements should pass through a system intergration process.

Impact Expanded Bus Service:

X Bus service may be improved by regional coordination of lines, schedules, fare structures and free transfers among the carriers presently operating within the corridor. Coordination will enable passengers to conveniently and economically transfer between carriers and can be accomplished by expanding the intersystem transfers between Tri-Met and Vancouver-Portland Bus Company and Vancouver Transit. Consideration should be given to the private carrier so that it will not receive any reduction in passenger revenue as a result of this procedure because the private carrier, unlike the public carriers, receives no subsidy to assure a continuation of service. This would result in a trip of 45¢ to 60¢ which is consistent with other fare structures in the region. The cost of this improvement is estimated at \$6,000/year for Vancouver Transit System and less than \$1,000/year for Tri-Met. In addition a similar

method may also be used for the private carrier serving the Camas-Washougal area. Tri-Met could install toll free telephone service from Vancouver to its information office which can be done for a nominal cost of approximately \$6 per month plus 30¢ per call; thereby, providing Clark County residents with free information relating to Tri-Met lines for trips into the Portland area. A route map should be placed in the Vancouver telephone directory illustrating Tri-Met, V-P Bus Co., and Vancouver Transit System routes and points of transfer. Similarly, the same map should be placed in the Portland telephone directory. The map should also contain the information telephone numbers of all three carriers. Another service improvement would be the location of the bus shelters planned by Tri-Met at Interstate and (1) Killingsworth St. and (2) Portland Blvd. The shelters should be placed such that passengers waiting in shelters for buses of either carrier may see buses approaching so that they can move to the proper bus stop to board their bus.

EXCLUSIVE TRANSIT ROADWAY:

Roadway improvements relating to bus transit operations may consist of an exclusive contra-flow lane, concurrent-flow on shoulders, concurrent-flow on exclusive lane and priority "on" ramps for high occupancy vehicles which include buses and car pools. The following narrative describes these types of exclusive lanes:

1. Contra-flow Lane - This type exploits the fact that one direction of traffic flow is reasonably light during the peak period in contrast to the opposite direction; therefore, the inside lane on the lightly traveled roadway is used for buses and car pools which opposes the direction of the lighter flow.
2. Concurrent-flow on shoulder - This type makes use of the shoulders, during peak periods, so that buses and/or car pools, traveling in the same direction as adjacent the lanes, are not impeded by the roadway congestion.
3. Concurrent-flow on exclusive lane - This idea simply utilizes one lane, usually the inside one for the exclusive use of high occupancy vehicles.
4. Priority "on" ramp - Permitting high occupancy vehicles to enter the freeway without delay while "metering" the other traffic is the essence of this type. This method is more effective when used as a part of a freeway control system since such a system will maintain higher operating speeds which provides an advantage for

transit vehicles to use the facility.

EXPRESS BUS SERVICE:

X
The express bus system (EBS) is a form of rapid transit because it provides quick point to point service with few stops. In order to provide an adequate system the following elements should be considered and incorporated as feasible:

1. Adequate fringe interfacing (parking) areas with low cost parking.
2. Adequate feeder systems at both ends of the trip.
3. Terminals and vehicles designed for quick loading and unloading.
4. Exclusive ramps and roadways where delay on road network will occur for transit vehicles.
5. Low fares and parking fees which include parking costs.
6. High speed non-stop service.

In relation to the Interstate Bridge Corridor project, EBS was considered with five origins in Vancouver and Clark County and five destinations in Portland and Multnomah County. These possible express bus routes resulted from the analysis of the origin - destination survey discussed here in. The express buses were assumed to operate as a feeder on the local arterials and become truly express upon entering the freeway. Depending upon demand, it may be necessary to have the buses stop at the terminal in downtown Vancouver.

The five possible origins considered in Washington consisted of the following corridors:

1. Lewis and Clark Highway (State Route 14) Corridor would serve neighborhoods near this route between Washougal on the east and I-5 on the west.
2. Mill Plain Blvd corridor would provide service to the east Vancouver heights and other section between Ellsworth Road and I-5.
3. Fourth Plain Blvd Corridor would serve development along this route between Sifton and I-5.
4. 78th Street Corridor was conceived as a means of serving a stripe bounded by Sifton on the east and Fruit Valley on the west.
5. Interstate 5 Corridor was designed to service the Hazel Dell area in the vicinity of 78th Street and Main Street interchanges.

The destinations which were selected for consideration are described as follows:

1. Portland city center is an area bounded by the Willamette River and I-405.
2. Lloyd Center complex is a section of east Portland generally encompassed by I-5, Morrison Ave, Thompson Ave, and 20th Street.
3. Swan Island Industrial Park.
4. Northwest Industrial area is a district surrounded by the Willamette River and U.S. 30.
5. North Portland is an area bounded by Columbia Blvd, Portland Road, the Columbia River, and the Portland Airport.

Table VII-1 summarizes the total person trips and expected transit passengers from the selected corridors and destinations. Along with this data fieldtrips and ariel photographs were examined on each corridor to subjectively evaluate the location of the development within the various corridors for route selection.

INTERFACE FACILITIES FOR PARKING AND TRANSFERRING:

The interface facilities between modes, systems and lines may be palced in one of three classes. The first class, park and ride stops, contain a parking area (autos and cycles), feeder service, an information board and a shelter. The second class, park and ride station, includes the facilities of a stop except it has a larger parking area a more extensive feeder service, concessions and comfort facilities. The third and final class, a terminal, adds ticket and information offices and also provides interfacing (transferring) between predominate modes, systems of the same mode and/or lines of the same system.

The major emphasis of this study is for the first classification which may be located near residential neighborhoods or the intersection of major arterials. The several corridors have been examined for possible sites for transit stops and it appears that many public and private sites have considerable merit. The location of these are summarized on Table VII-2.

RAIL PASSENGER SERVICE:

Improvement of passenger rail service on the I-5 corridor may be obtained by providing commuter rail service in the morning peak period (service is presently provided in the

evening) and a feeder bus system in Vancouver. This service may be provided in one of two ways: 1) Amtrak could reschedule its service to match the AM peak or 2) other rail users add passenger cars to freight trains which leave Vancouver during this peak period. It has already been established that heavy freight demand precludes the use of this rail line for significant commuter service. Some parking area is available at the rail depot, however, some design and installation work would be necessary for it to become adequate. It should also be noted that this rail depot does not have good access with local arterials in Vancouver and is not located near any dense residential areas. It would be advantageous to the public for Vancouver Transit System to serve this rail depot.

SOCIO-ECONOMIC

The socio-economic improvements often address the more fundamental or basic issues of mobility. For instance, rather than designing for additional transportation capacities perhaps some changes in the socio-economic system may reduce the mobility needs or fulfill that need without travel or more efficiently utilize existing systems. This realm of improvements considers attitude, education, acceptance of an existing transportation system in contrast to changes in that system which improvements of this type have been divided into five categories: work schedules, marketing programs, car pooling, incentives and reducing travel need.

WORK SCHEDULE:

This category is primarily directed to reducing the peak period demand on transportation facilities of all types - highway, rail, air etc. There are three types of work schedule revisions which are possible and will tend to reduce the peak period demand, namely, staggered work hours, staggered work day and the four-day work week. Staggering work hours is merely distributing the starting and ending times of the work day such that there is no pronounced peak in the transportation system. If the work day is staggered so that the work force reports five and six or seven days each week one can easily see that 100% of the work force is distributed through a time period of 120%

*Coupled
with
Express Special
Bus*

or 140%. The final possibility reduces the one weekly work trip since only four trips occur each week for the ten hour work days.

These three types may be combined to simultaneously obtain benefit from all of them. That is, the work force may be divided among six or seven days, each employee work four days and may start work between 6 to 10 am (nominal) while initiating departures for home from 4:30 to 8:30 or 9:00 pm. (depending upon the length of the lunch period). It is apparent that changes in weekday activities and life-style may be required but with an effective program changing for schedules a substantial reduction in peak period demand can be expected. Whether it be rail, bus or auto travel such an effective improvement will reduce the capital costs for the transportation system or conversely will increase the capacities of existing facilities such as the Interstate Bridge corridor. Figure 4¹¹⁻¹ illustrates the pronounced peak period traffic volumes that occur on the Interstate Bridge.

MARKETING PROGRAM:

Increased usage of a service or product of any kind may be obtained, without improving the service or product through the use of effective marketing programs. Good public relations, advertising and information dissemination will inform the public of a service or product, accent its strong points and encourage its usage. This is an area where transit operators have been dilatory in duty because one source indicated that several large operators usually allocated less than 1% of gross revenues to programs of this nature. Transit service which possesses considerable public awareness is more likely to be used than other without the public awareness. As the carriers, servicing the Interstate Bridge Corridor expand and intensify their marketing programs it would follow that the ridership will increase. It is obvious that one will not ride transit unless he knows that it exists.

CAR POOLING:

Since the occupancy rate of autos in the am peak period was only 1.25, there is considerable passenger capacity unused.

In terms of user cost and energy efficiency a fully loaded auto is very competitive with many other modes as evaluated in another section herein; however, with this occupancy rate the establishment of a car pool depends upon several elements of a trip:

1. The arrival and departure times of both the initial and return trip are nearly the same.
2. The routes are nearly coincidental.
3. Interested trip makers know of other making the same trip.
4. Reasonable social compatibility among users.

There exists in this region two car pooling programs based on the Federal Highway Administration computer matching system. One was designed to operate in Clark County, which was funded by WSHD and the City of Vancouver, and the other in Oregon by UMTA and Tri-Met. Logically the separate efforts should be combined to improve the probability of matching potential poolers.

An effective carpooling program enables persons in the region to be notified of others of similar trip characteristic through four phases:

1. Public Information to inform public of advantages of reduced congestion, out-of-pocket-costs, air pollution, energy usage and increased conveniences.
2. Incentives such as prime parking spaces, remote parking facilities for carpools and exclusive ramp and/or lanes for carpools.
3. Data Processing to match and inform perspective poolers to each other.
4. Continuing Service to accommodate personnel turnover and changing living patterns.

The carpool efforts contain these characteristics but have only had limited success in this corridor. However, as the two separate efforts are merged and persistence is maintained a significant increase in the automobile occupancy rate may be expected.

REDUCING TRAVEL NEED:

While it is acknowledged that mobility is basic and necessary for human existence one may address the issue of transporting persons across the Interstate Bridge modify the socio-economic system to fulfill the trip purpose or need for an individual without him making the trip. There are two basic types of possible improvements that approach this

concept. The first consists of circulating goods/services in mobile vehicles in areas requiring its products, thereby, eliminating the need for some trips. A specific example of this would be a milk run operation that would also sale other grocery type goods in addition to dairy products. The other possibility is a suburban employment facility which would enable some types employees to preform their work a office building within walking or cycling distance of their homes. Tje office facilities could contain basic office equipment and services - copy machines, typing, receptionist, lunch room, telephone TV, etc. This concept would not only reduce the demand on the regional transportation network but would improve helath through exercise and also the travel time to and from work.

INCENTIVES:

The philosophy of incentives consists of instituting indirect changes which will bring about a direct overall benefit. Incentives may be positive or negative and to provide a comprehensive approach to the transportation problem will most liking involve both types which are divided into several aspects as follows: CBD traffic zones, auto exclusion areas, toll fees, special fees, insurance rates and selective enforcement. The six possibilities each have potential but the consequences should be carefully examined to prevent adverse impacts from occuring. The following information describes the possibilities.

1. CBD traffic zones prohibit movement of auto traffic between zones but permit unrestricted movement of transit vehicles.
2. Auto exclusion areas include such measures as exclusive transit lanes and ramps, transit and pedestrian malls, exclusive bikeways, etc.
3. Discriminatory toll fees usually refer to facilities user fees and as an auto dissincentive would be collected for autos be others such as transit would not pay user fees.
4. Special fees for autos may be a special license to operate in selected areas or progressive license fees on second, third, etc, autos.
5. Insurance rate differences between individuals who used their auto to commute to work and those who ride transit, become considerable.
6. Selective enforcement could permit transit vehicles to operate in excessive of the speed limit while strictly enforcing speed limits for non-transit vehicles.

HIGHWAY OPERATIONS

There are several classes of improvements which are operational in nature and consist of traffic control systems, emergency service, reversible lane operations, narrow lanes to accommodate an additional lane and dynamic warning signs. These improvements, generally, are not costly in contrast to the cost of constructing new facilities or reconstructing old ones.

TRAFFIC CONTROL SYSTEMS:

The proper application of traffic control devices has provided considerable improvement in many operational problems in urban areas at a very nominal capital cost. There are three types of control system applicable to this corridor; namely, ramp control and metering systems, signal interconnect systems and transit vehicle signal pre-emption systems.

- A) Ramp control and metering systems have been developed to monitor freeway and ramp traffic so as to reduce the demand on the freeway to maintain reasonable operational speeds (about 40 wpm) and eliminate congestion. One of the basic system features is one or more parallel routes for shorter trips when the freeway is metered and Interstate and Union Avenues in Oregon and Main St. in Vancouver provide this feature. The ramp system may be designed to operate in one of several modes, all of which are operational as briefly described and illustrated on figures VII-3, 4, 5, 6 and 7.
1. Manual mode - This is accomplished by the installation of a traffic signal which is operated by an observer at the location (on ramp) observing traffic conditions and controlling the signal on subjective judgement.
 2. Fix Time Mode - This method uses a time clock to operate a traffic signal. The daily (weekly) time periods and amounts when the ramp traffic entering the freeway needs to be reduced are anticipated from previous traffic counts.
 3. Capacity/Demand Mode - The lane occupancy (probability of a detector being occupied by a vehicle) is normally used to determine the ramp volume which should be permitted to enter the freeway mainline. Unlike the previous two this mode requires detection as illustrated below and a logic controller to receive and analysis data and make decisions.
 4. Gap Acceptance Mode - This system searches for a gap in the right lane of the freeway and releases ramp vehicles such that it

geometrics. ... useful when the freeway and ramps have poor

5. Merging Mode - The merging mode is similar to gap acceptance but it "paces" the ramp vehicle to the merge area. To accomplish this, a computer is required and is, therefore, relatively expensive. This system also requires good geometrics on the freeway.

B. Signal interconnect systems have been installed on arterials and provided improvement parallel on freeways through increasing the arterial operation speeds. At the same time signal systems on perpendicular streets which interchange with a freeway may be programmed so as to reduce the operational speed and, thereby, reduces the access to the freeway.

In relation to I-5 immediate improvement may be provided by the installation of a signal system at the intersection of the northbound off-ramp and Portland Blvd. with queue detection on the ramp and logic to extend the green time and prevent traffic from back up on the freeway. Similar strategy may be applied to Going Street off-ramp.

C. Transit signal pre-emption systems as successfully tested consist of electronic devices constructed such that a transit operator can send a pulse (message) to the local traffic signal controller at an approaching intersection. This pulse can then pre-empt the signal operation to assure that the transit vehicle will have a green light when it reaches the intersection.

EMERGENCY SERVICE:

One of the most critical conditions within the corridor develops when traffic accidents occur on the one of the two bridges to Hayden Island during one of the peak periods because the congestion is extreme and emergency vehicles arrive at the scene only after considerable delay. If the accident report could be completed more quickly and victims and involved vehicles removed in less time than at present, the delay and probability of other collision will be reduced. There are two possible operational improvements of this nature applicable in this corridor. The first is the practice of emergency vehicles entering off-ramps the wrong way and traveling in the reverse direction to the scene of the accident. This, of course, requires special traffic control but would improve the present conditions. The second possibility is that of ambulance heliport facilities.

NARROW LANES:

The final potential highway operational improvement is rather simple and merely consists of midgiving pavement markings such that the roadway accommodates an additional lane in each direction. This measure would substantially increase the capacity at minimal cost and is applicable to the Interstate Five, particularly in the vicinity of Portland Blvd. By revising the pavement markings on Union Avenue on-ramp to "force" the Swift St. traffic to merge before approaching I-5. Caution should be exercised with this measure, particularly if there is a significant reduction in shoulder width.

INNOVATIVE (NEW) SYSTEMS:

These potential improvements tend to be more cost intensive than the other improvements discussed previously and are either newly developed or in research and development or conceptual stages. This list is intended to be comprehensive so as to address all possible solutions.

There are five types of innovative systems studied for application in this corridor; namely marine, air and ground systems. The characteristics ^{of various} innovative systems are depicted on table VII-3 and briefly described herein.

MARINE:

Because of the rivers near the Interstate Bridge Corridor, marine systems are a natural possibility; therefore, three were considered for possible application: superferry, hydrofoil, air cushion marine vehicles. Superferries can transport up to ²⁰⁰ autos and ²⁰⁰⁰ passengers, depending on the vehicle, at speeds near 20 knots per hour. Successful ferry operation normally results

where the ferry has no viable alternative from land or air modes; therefore, with the relatively low operating speeds, substantial terminal times and land modes it appears that superferries have questionable potential in this corridor. The next possibility is the hydrofoil vehicle which has essentially the same characteristics except for the speed. The foil devices permit the vehicle to "lift up" and travel on "fins" and thus reduces the "hydro-drag" force. The third vehicle considered travels on a cushion of air and, thereby, reduces drag. These vehicles operating in excess of 40 knots per hour and transporting up to 70 passengers could provide reasonable service in this corridor. All marine systems will have the disadvantage of a longer route than many other modes because of the river route from Vancouver CBD to downtown Portland is about 16 miles in contrast to about 8 miles for highway users.

AIR SYSTEMS

Since the nature of air travel does not lend itself very well to short trips as discussed previously, there was only one considered which was a helicopter service to extremely dense trip producers and attractors.

GROUND SYSTEMS

There are numerous distinct ground transportation systems which, for purposes of this analysis, have been grouped into fourteen systems and three system groups classified by roadway; namely, rail, pavement and levitation. Rail roadways consist of either steel rail or concrete beams while paved roadways are

are constructed of concrete and asphalt and for levitating systems which suspend vehicles above a concrete or metal roadway by using compressed air or magnetic flux. The energy delivery to the vehicles of the various systems may be one of two methods; namely, dynamic and static. The dynamic methods include electrification through overhead wiring or a third rail and the static method consists of fuel storage units (tanks and batteries) and refueling stations. The line or lanes capacity of these systems varied from a few thousand to approximately 70,000 passengers per day; however, in considering capacity one should keep in mind that as the demand on particular system increases sufficiently a more intensive system may become feasible before the capacity of the existing system is reached. Subsequently, capacity on rail and bus, especially, tend to be a function of demand. In addition, the capacity of rail systems is a function of the station length which determines the length of the train.

Innovative improvements for highway include the Electronic Route Guidance System (ERGS) and the Induction Conductor Control System (ICCS). The ERGS consists of several parts, namely, roadway detectors subsystem data process unit, central system data process unit, display panel and coder in vehicle. The driver of the vehicle selects the desired destination by code identification as illustrated in figure . The selected information transmitted to a subsystem controller which sends basic instructions to the dash board panel for the driver to follow. This could be useful in directing motorists to non-

congested routes within the Interstate Bridge Corridor but is only in the R & D stage of development. The ICCS is another system consisting of guidance devices in vehicles and buried cable which may be adapted to an existing highway network. Such a system would be similar to the innovative P.R.T. types except this concept could make use of present vehicles which have been modified to operate on highways either "guided" or "unguided". This system is similar to the ERGS in that both are years from any significant demonstrations.

COLUMBIA RIVER CROSSING STRUCTURES

In consideration of providing additional capacity across the Columbia River there were two possible approaches. The first approach was the modification of existing bridges while the second consisted of the construction of new structures.

There were three means of modifying existing structures: 1) widen bridges, 2) outrigging and 3) double decking. The practice of widening bridges has been done successfully and feasibility so long as the bridge initially did not have superstructure but the cost to widen the superstructure is generally prohibitive. The outrigging possibility consists of attaching an additional lane on either or both sides of an existing structure which must be of sufficient structural and foundation limitations and in addition, sufficient length clearance (16.5') must be provided between roadways and/or structure.

In studying the new structure there were three which include 1) high level bridge, 2) a floating bridge and 3) under-river tube. The first potential improvement would be high enough to permit ground transportation systems to operate without interruption by river traffic which presently interrupts highway and transit traffic frequently. The second improvement would be interruptable by river traffic but would still provide additional capacity and a lower cost for floating bridge while the third possibility, a tube, would most likely be a part of an underground system in the corridor and would, of course, not be subjected to river traffic interference.

SUMMARY

STAFF TEAM PROBABLE SYSTEMS

TABLE VIII: INTERSTATE BRIDGE CORRIDOR FOR EXPRESS BUS SERVICE

ORIGINS (CORRIDORS)	DESTINATIONS		
	Portland City Center	Lloyd Center Complex	Total
Lewis & Clark	264 (12) (53)	150 (2) (30)	404 (14) (83)
Mill Plain *	577 (54) (115)	342 (8) (60)	919 (62) (175)
Fourth Plain	375 (53) (75)	274 (11) (55)	649 (64) (130)
78th ST.	402 (52) (80)	238 (1) (48)	640 (53) (128)
I-5	285 (29) (57)	265 (9) (53)	550 (38) (110)
Hazel Dell *	361 (54) (72)	257 (1) (51)	618 (55) (123)

* Recommended for a Demonstration Project.

I 500 Shift
For HLL

- NOTE:
1. Some of the corridors are not mutually exclusive in area coverage.
 2. The expected transit ridership is based on frequent and reliable service. (m/s=2) (see Appendix)
 3. xxx represents the total person trips from 6 AM to 9 AM.
 4. (xx) the top figure is the exist^{ing} number of person trips by transit and the bottom figure is the expected transit usage after improving the service.

11-2

TABLE - POSSIBLE PARK AND RIDE LOCATIONS BY CORRIDORS

INDUSTRIAL & CLARK

Industrial Complex
Grand Ave.

MILL PLAIN

anc. Ship Yard
Evgl. Free Church
5602 E. Mill Pln.

FOURTH PLAIN

Fred Meyers
4th Plain & Grand Ave
Keils Food Store
4th Plain & 72nd Ave

78th STREET

Col. River High Sch.
800 NW 99th St.

I-5 (HAZEL DELL)

Fred Meyers
7700 Hwy 99

HD R/W
Blsworth Rd.

Emm. Luth. Church
8310 MacArthur

Messia Luth. Church
9306 NW 9th Ave.

Keils Food Store
303 NE 78th St.

HD R/W
E 164th Ave.

Vanc. Fire Dept.
8309 MacArthur

Hazel Dell Free Evngs.
8802 NW 9th Ave.

Hazel Dell Drive-in
I-5 & 78th St (SW)

HD R/W
ast Camas I.C.

Trin. Bapt. Church
6700 MacArthur

Eisenhower Elem.
9201 NW 9th Ave.

Totem Pole Shpg Cntr
7800 Hwy 99

HD R/W
-5 W/SR500

Grace Luth. Church
9900 E. Mill Pln.

Jason Lee Jr High
8500 NW 9th Ave

Dscnt. Dcrtg. Center
2909 E. Mill Plain

Vanc Schl District
Mill Pln & Ft. Vanc.

11-2

TABLE VIII-3 A COMPARISON OF THE CHARACTERISTICS OF VARIOUS TRANSPORTATION SYSTEMS CONSIDERED FOR THE INTERSTATE BRIDGE CORRIDOR.

TYPE	NATURE OF SERVICE	ROADWAY	ACCESS CONTROL REQUIRED	PROPULSION	ENERGY EFFICIENCY (Btu-mi./gal.)	APPROX. OPERATING SPEED (MPH)	CAPACITY	RELATIVE AVAILABILITY OF ENERGY FLEXIBILITY	NOISE QUALITY	FEEDER SYS. REQ'D	Technology Status	Capital Cost	Contract Impact
Gravity-Vacuum Tube	Inter/Intra-Urban	Rail in Tube	Full	Electricity 1/3 Gravity 2/3	30	150	High	Poor	Good	Yes	R&D	Very High	Light
Heavy Rail	Inter/Intra-Urban	Rail	Full	Electric/Fossil Fuel	40	100	High	Fair/Poor	Fair	Yes	OPER	High	Moderate
Light Rail	Intra-Urban	Rail	Partial	Electric	60	50	Medium	Fair	Fair	Yes	DEMO	Moderate	Light to Moderate
Monorail	Intra-Urban/Local	Rail	Full	Electric/Fossil Fuel	30	45	Medium	Fair/Poor	Fair	Yes	OPER	High	Moderate
Palletized Automated Transportation (PAT) (Dual Mode)	Intra-Urban	Rail	Full	Electric	NOT AVAILABLE	30	Lower Medium	Fair	Good	Yes	R&D	High	Moderate
Personal Rapid Transit (P.R.T.)	Intra-Urban/Local	Rail/Pavement	Full	Electric	NOT AVAILABLE	50	Lower Medium	Fair	Good	Yes	R&D	High	Moderate
Auto-Train	Intra-Urban	Auto-Train with Pavement	Full	Fossil Fuel	30	200	VERY LOW	Poor	Poor	Yes	DEMO	Very High	Moderate
High Speed Tube Transit	Intra-Urban	High Speed Tube	Full	Electric/Fossil Fuel	NA	300+	High	Fair/Poor	Good	Yes	CNPT	Very High	Light
Auto	Local	Pavement	None	Fossil Fuel/Electric	45	70/30	LOW	Poor/Fair	Poor/Good	No	OPER	Low to Very High	Major
Cycleways (Bicycles)	Local	Pavement	Full/None	Organic (Human)	1,500 (EST)	20	VERY LOW	Good	Good	No	CNPT	Medium	Moderate
Demand Responsive Bus	Local	Pavement	None	Fossil Fuel/Electric	30	35	LOW	Poor/Fair	Fair/Good	No	DEMO	LOW	Light
Automated Busway (Dual Mode)	Local	Pavement	Full/None	Electric/Fossil Fuel	110	60-35	Medium	Good/Poor	Good/Fair	Partial	CNPT	Medium	Moderate
Express Bus	Local	Pavement	None	Organic (Human)	1,200 (EST)	25	VERY LOW	Good	Good	No	DEMO	LOW	Low
Pedestrian	Local	Pavement	None	Organic (Human)	1,000 (EST)	4	VERY LOW	Good	Good	No	OPER	LOW	Low
Hydrofoil (Dual Mode)	Inter/Intra-Urban	Water	Full	Fossil Fuel	30	40-60	VERY LOW	Poor	Fair	Yes	OPER	LOW	Low
Air Cushion Vehicle	Inter/Intra-Urban	Water	Full	Fossil Fuel	35	40-60	VERY LOW	Poor	Poor	Yes	OPER	LOW	Low
Super Ferry (Dual Mode)	Inter/Intra-Urban	Water	Full	Fossil Fuel	150	20	LOW	Poor	Poor	Yes	OPER	LOW	Low
Helix-Taxi	Intra-Urban	Atmosphere	Full	Fossil Fuel	20	200	VERY LOW	Poor	Poor	Yes	OPER	LOW	Low

Figure VII-1

HOURLY TRAFFIC VOLUMES (VPD)
INTERSTATE BRIDGE
OCTOBER 24, 1973 (WED)

Volumes per hour

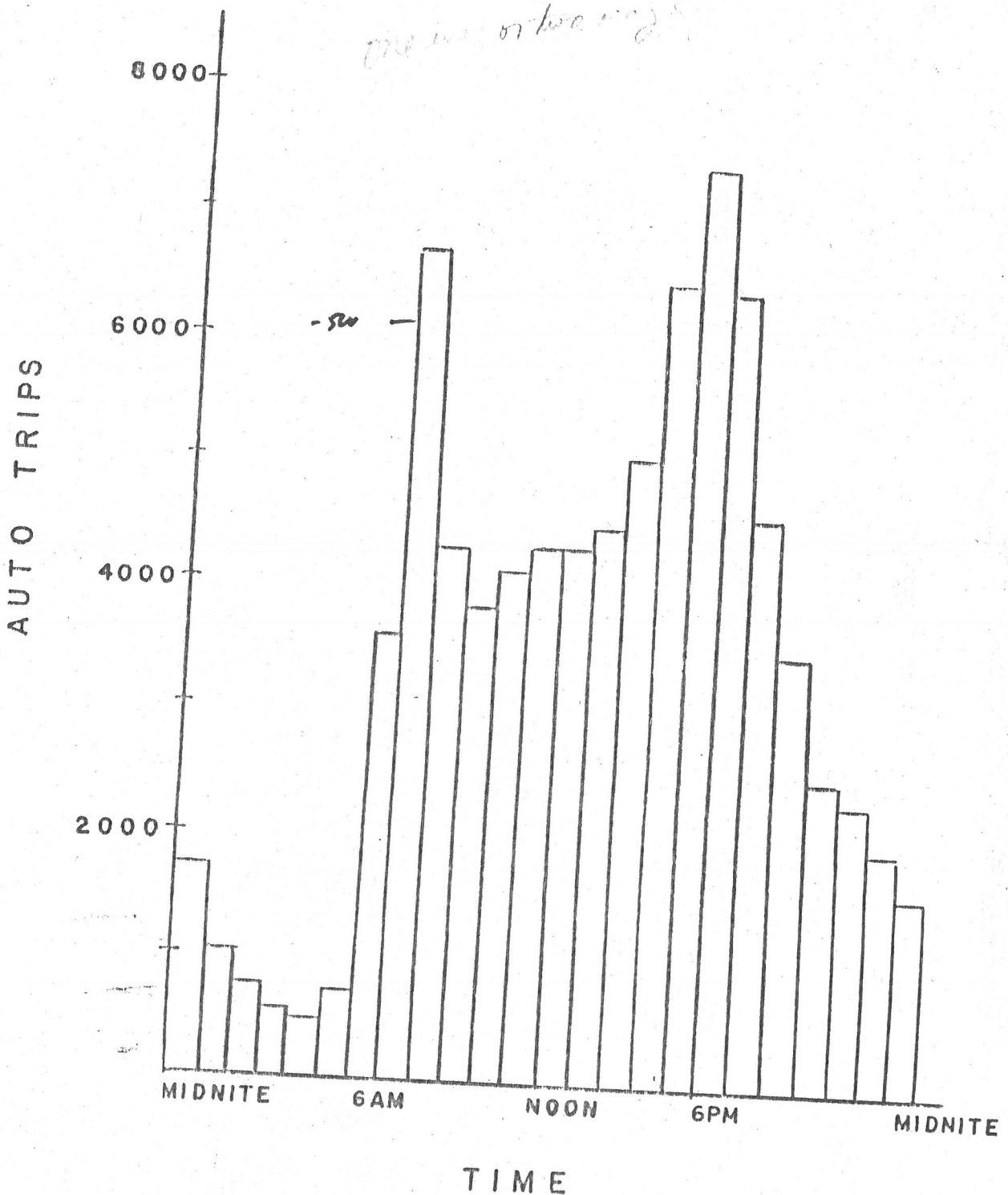
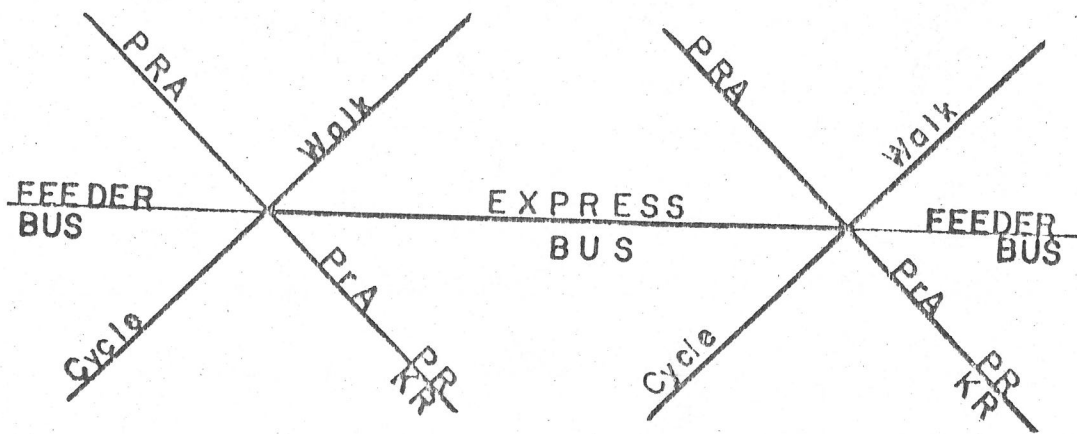


FIGURE VII-2
 THE EXPRESS BUS SYSTEM
 IN CONCEPT



PrA: Private Auto
 PRA: Public Auto (cycle) Rental
 PR: Park and Ride
 KR: Kiss and Ride

FIGURE VII-3
 RAMP METERING: MANUAL MODE

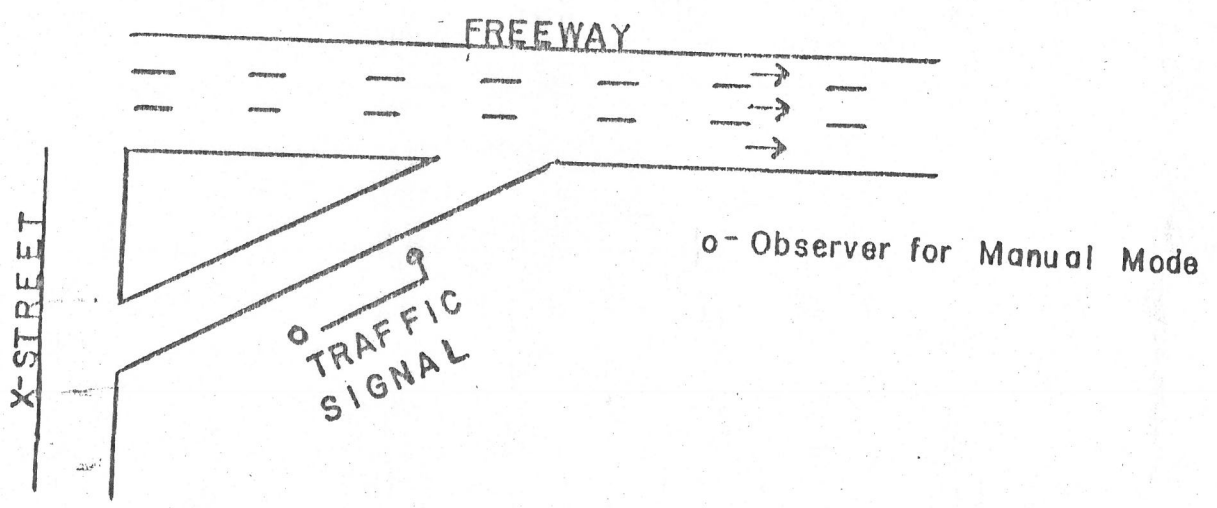


FIGURE VII-4

Ramp Metering Fixed Time Mode

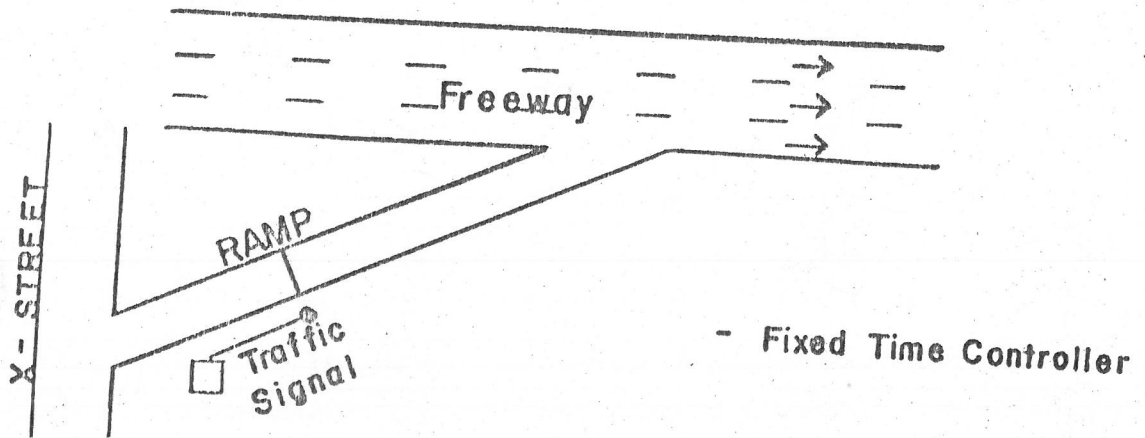


FIGURE VII-5

Ramp Meter - Capacity / Demand Mode

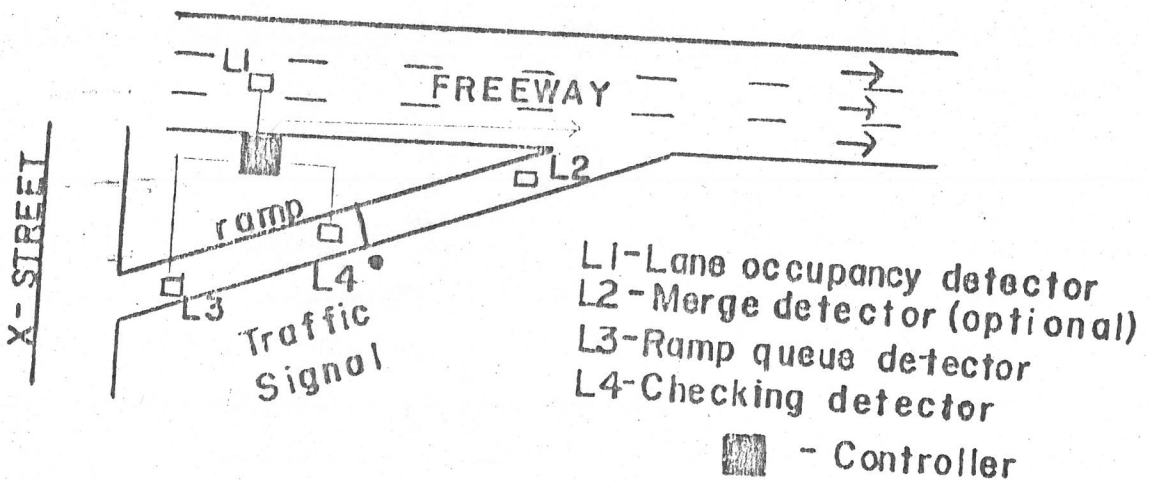


FIGURE VII-6
 Ramp Metering - Gap Acceptance
 Mode

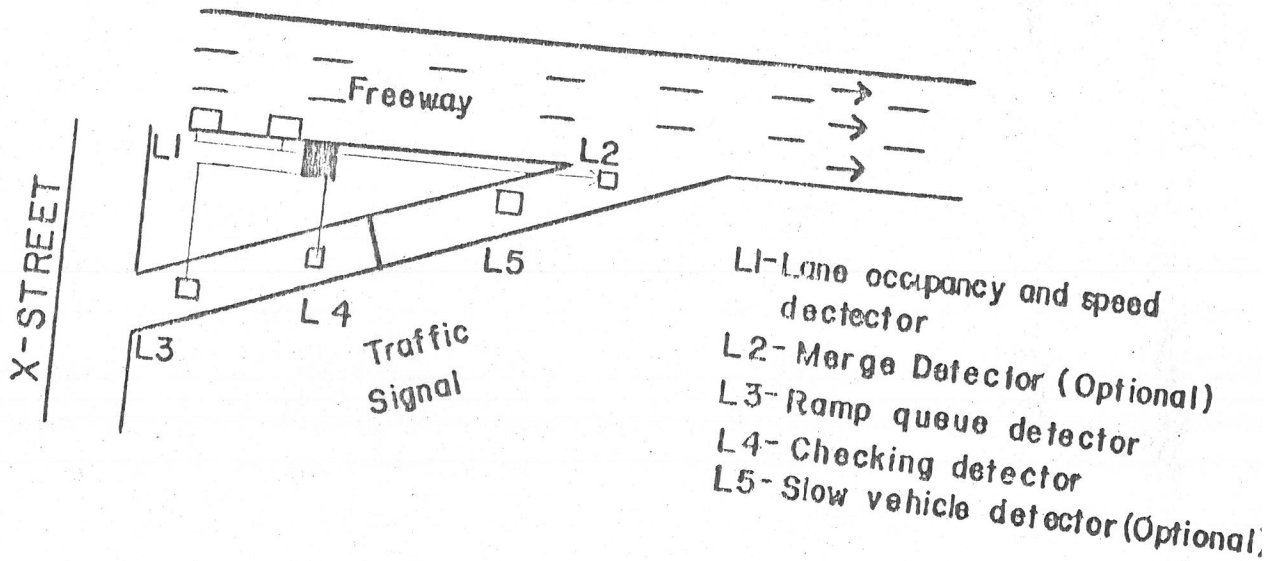


FIGURE VII-7
 Ramp Metering - Merging Mode

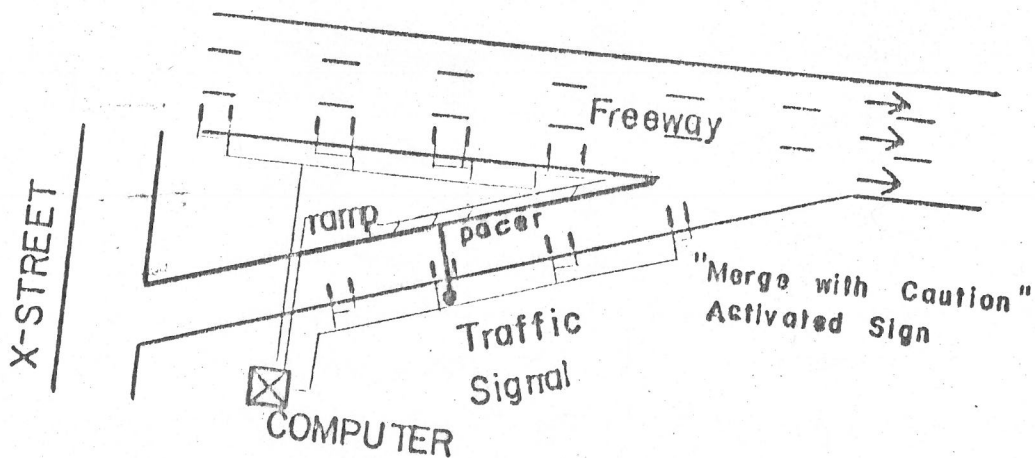
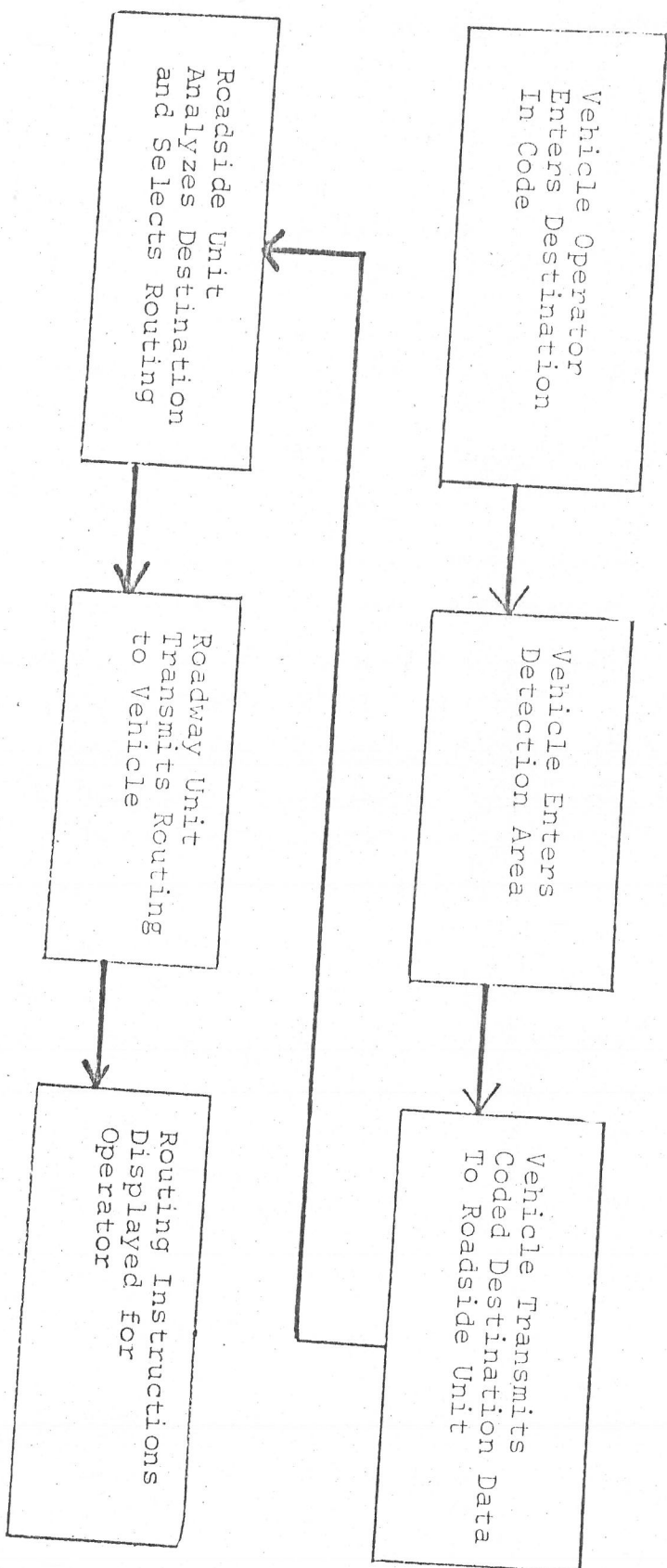


FIGURE VII-3

ELECTRONIC ROUTE GUIDANCE SYSTEM (ERGS)
OPERATIONAL FLOW
DIAGRAM



PRELIMINARY

The transportation system in Portland-Vancouver Region, not unlike other urban areas evolved from a mass transit type in the earlier part of this century to a highway network for autos and trucks. To illustrate this point, it was determined that about 100,000 trips of which 1% use mass transit cross the Interstate Bridge each day.

At the present time two private and two public carriers provide transit service within and between Portland and Vancouver. This situation has brought on significant disincentives to use bus transit because essentially all trips across the Columbia, require transfers and multiple fares.

During the past 25 years transit ridership in the Portland area has consistently declined to about 30% of the post World War II level. However, in late 1960's the trend changed and small increases were reported. These small increases were boasted during the winter of 1973-74 by the fuel shortage and price increases.

With decreases in transit usage and increased reliance on the auto congestion and associated problems of delay, pollution, irritation, profane utterances, etc. have become apart of everyday commuting within the urban area despite the construction of several freeways.

Transportation of goods within the corridor was found to be accomplished primarily by truck with some movement by rail and marine vehicles.

Vancouver has been served by an express bus service through a private carrier which provides limited parking and non-stop freeway trip to downtown Portland. Expansion of this type of service appears feasible.

Recently separate carpooling programs in Oregon and Washington were established to address the fact that the auto occupancy rate was approximately 1.25 person per vehicle. Negotiations to merge these separate efforts is in progress.

Within the region some staggering of work schedules has occurred but for the most part it has been on an individual

well ?
Negotiate
WHAT CAN
BE DONE.

Re...

basis and without any regional coordination. A well planned and extensive regional program has considerable merit and could reduce peak demands.

Because of the state line is within the corridor, there are some special legal problems in developing a regional transportation operator. Oregon law permits Oregon transit authorities to operate in Washington but Washington law did not permit Washington counties to contract with Oregon transit authorities for providing service in Washington until recently.

Existing and emerging technology has numerous possibilities in transportation systems to consider in coping with the major problems within this corridor. Subjectively, a busway, exclusive bus lane and light rail seem to merit further study.

IX RECOMMENDATIONS FOR IMMEDIATE
IMPLEMENTATION

Revised

As a result of the findings and conclusions of this analysis, ~~six~~ ^{seven} significant recommendations were established for immediate low-cost improvements which are set forth herein.

X These seven recommendations include improvements in the express bus service (which consist of two bus routes, park and ride facilities and additional use of existing rolling stock) intersystem transfers, consumer information service (including toll free telephone line, route map in telephone directories and bus transfer points), region wide carpooling program, exclusive lane for high occupancy vehicles highway operations and passage of enabling legislation in the State of Washington.

A description of these recommendations are as follows:

1. Express bus service in Corridors.

It is recommended that express bus service to downtown Portland, and the Lloyd Center area by provided in the Mill Plain and Hazel Dell Corridors. This service is designed primarily to serve work commuters and operate during the morning and evening peak periods. Morning buses will serve commuters with report times at 7:30, 8:00 and 8:30 a.m. Evening buses will begin departing downtown shortly after 4:00 p.m. with service every half hour to 5:30 p.m. for a total of four p.m. trips. Care should be taken to insure that the bus departing the downtown area at 4:00 p.m. arrives at the Lloyd Center at a time convenient to serve the large number of Federal office workers released at 4:15 p.m.

Route No. 1 (Service for the Mill Plain area) should begin

in the vicinity of the intersection of Mill Plain and Ellsworth. Buses will proceed west on Mill Plain to Andersen Rd., turn south to McArthur Blvd., then west to Mill Plain Blvd., thereon to the I-5 freeway, exiting at 4th Street for a stop at the Vancouver Portland Bus Terminal to permit transfers and boarding of additional passengers. From the VP Terminal, buses will proceed via I-5 on an express route to the Lloyd Center area, stop as necessary and then proceed to the downtown Portland area via the Steel Bridge.

Route No. 2 (Service to Hazel Dell) should begin at a Kiss and Ride facility at Columbia River High School. Buses will then proceed south on N.W. 9th Ave. to 78th St. and turn east to Old U.S. 99, turn south to I-5 and utilize the freeway to 4th St. and continue in the same manner as route 1.

It is also recommended that several Park and Ride facilities be established in existing parking lots along these two routes. In the Mill Plain route, park and ride lots should be located at the Tower Mall, Grace Luthern Church and Hudson's Bay High School. For the Hazel Dell Route, park and ride sites should be located at Hazel Dell Evangelical Church, Messiah Luthern Church and possibly the Hazel Dell Fred Meyer shopping center.

These park and ride facilities should be adequately identified through the use of informational signs. In addition, signs noting the location of the larger sites should be placed along those main streets leading to the site. Some Federal aid funds may be used for these facilities.

It is recommended that Vancouver-Portland Bus Company

Expansion should include the following improvements:

1. Provide maps, information folders, and car pool application forms in public places in Vancouver and Clark County.
2. Provide a toll free number which Vancouver residents may call to obtain car pool information.
3. Expand the car pool grid system or develop a manual system to include a larger area of Clark County in the program.
5. Exclusive Lane for High Occupancy Vehicle Lane (NTECAP Demonstration Project)

It is recommended that an application for Federal funding for designation of a high occupancy vehicle lane be made under the National Transportation Energy Conservation Action Plan. This lane should be on the I-5 Freeway extending from Vancouver to a point in North Portland and provide a special vehicle lane for buses and high occupancy autos to relieve traffic congestion on the freeway and provide an incentive to utilize high occupancy vehicles in the corridor.

6. Recommendations expecting to cost not more than \$50,000 for improving the existing highway operations consist of the following:

- a. Evaluate the installation of a signal at the Portland Blvd. northbound off-ramp terminal with ramp queue detection and logic to prevent queue from extending back to the freeway.
- b. Study the modification of the signal at Going Street and Interstate Avenue to reduce the queues which often extend back to the freeway. Perhaps a measure similar

thereby encouraging additional ridership, it is recommended that the following customer services be instituted:

- a. Tri-Met should install toll free telephone service to its information office. This can be done for a nominal cost of approximately \$6 per month plus 30¢ per call, and would provide Clark County residents with free information relating to Tri-Met lines when planning trips into the Portland area.
- b. A route map should be placed in the Vancouver telephone directory illustrating Tri-Met, V-P Bus Co., Evergreen Stage Lines and Vancouver Transit System routes and points of transfer. The same map could also be placed in the Portland directory. The map will also contain information numbers for all four carriers.
- c. Tri-Met should review the location of bus shelters planned at Interstate and (1) Killingsworth Street and (2) Portland Blvd. and place the shelters in such a manner that passengers waiting in shelters for buses on both lines may see buses approaching so that they can move to the proper stop to complete their transfer.

4. Expansion of the Regional Car Pool Program

It is recommended that the Oregon DOT Regional Car Pool Program be expanded to include Clark County. This program should utilize any resources remaining from the USHD Car Pool program which has been discontinued.

to item a will aid this problem.

- c. Analyze Union Avenue northbound on-ramp to I-5 for pavement markings revision i.e., traffic buttons, etc., to improve the freeway operations.

7. It is recommended that legislation be passed in the State of Washington that would enable Clark County and the cities therein to create a county-wide transit system for the people of the county. Such transit systems would be established as identified in ~~item 3~~ ^{CLARK COUNTY} and would have authority to contract with other systems, if necessary, to provide service from the county to areas outside the county for the benefit of county residents. This legislation should be passed in time to enable service improvements developed in Phase I of the project to be implemented in the shortest time frame possible.*

X It is further recommended that the Tri-County Metropolitan Transportation District of Oregon (Tri-Met) begin immediate negotiations with the privately-owned Vancouver-Portland Bus Company for the purchase of that system. Purchase of the privately owned system by Tri-Met would provide for the interface of publicly owned systems in the corridor and would result in the provision of transit service in the corridor as dictated by public policy. Tri-Met or the proposed Clark County transit system should also consider the possible purchase of Evergreen Stage Line or at least part of its operation which serves the Camas-Washougal area, part of the City of Vancouver, and certain unincorporated areas of the county.

* Similar legislation was passed by the Washington Legislature in April, 1974.

The energy crisis, lack of additional vehicular capacity on the Interstate 5 facility and the environmental problems facing the area require early favorable action on the part of those involved in solving the transportation problems in the Portland-Vancouver Interstate 5 corridor.

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COLUMBIA REGION ASSOCIATION of GOVERNMENTS

6400 S.W. CANYON COURT
PORTLAND, OREGON 97221

(503) 297-3726

I-5 Project Subcommittee Meeting

Minutes

Present

John Perry
Pierre Henrichsen
Dick Granger
Dave Hupp
Bill Dirker
R.O. Cunningham
Dick Barnum
Chuch Neumayer
Ed Wagner
Pat Blackwell
Hurvie Davis
John Krawczyk
Reed Gibby

Representing

Tri-Met
WSHD
Clark County
Multnomah County
Portland
Oregon Highway Div.
RPC of Clark County
WSHD
Tri-Met
League of Women Voters
CRAG
CRAG
CRAG

The Project Management Board subcommittee met Friday, July 26, 1974 to review the Phase I Draft Report.

The meeting began with a lengthy discussion of high occupancy vehicle lanes and ramp metering which may be implemented on the I-5 freeway. With the issue still unresolved as to the best method to implement, representatives of the Oregon and Washington Highway agencies and Tri-Met agreed to meet and analyze the various schemes and select one for a demonstration under the "NTECAP" Program.

Preparation of an action plan which would be included in the report was agreed to by the subcommittee. The plan would contain an implementation schedule for the improvements suggested in Phase I and would list those agencies responsible for actually implementing the various improvements.

The second recommendation (express bus service) was discussed next in the meeting. It was agreed that formation of a regional transit authority in Clark County be discussed as a given in this section of the report rather than an option. It was also noted that Vancouver-Portland Bus Company was occasionally using a detour route to avoid heavy traffic on the

CLACKAMAS COUNTY

Canby
Gladstone
Happy Valley
Lake Oswego
Milwaukie
Oregon City
Sandy
West Linn
Wilsonville

CLARK COUNTY

Camas
Vancouver
Washougal

COLUMBIA COUNTY

Clatskanie
Columbia City
Prescott
Rainier
Scappoose
St. Helens
Vernonia

MULTNOMAH COUNTY

Fairview
Gresham
Portland
Troutdale
Wood Village

WASHINGTON COUNTY

Beaverton
Cornelius
Durham
Forest Grove
Hillsboro
North Plains
Sherwood
Tigard
Tualatin

I-5 freeway. Representatives of the City of Portland and the highway agencies agreed to cooperate with the Vancouver-Portland Bus Company to review existing traffic regulations and make necessary modifications to authorize these alternate routes.

It was agreed to add new recommendations which include a bicycle path, emergency towing and ambulance service for freeway accidents, and reaffirmation of an informal agreement between tugboat operators and the highway agencies relative to river traffic requiring the operation of the bridge's lift span.

In reference to the intersystem transfer agreements, it was suggested that this recommendation note the necessity of keeping bus drivers informed of these various agreements.

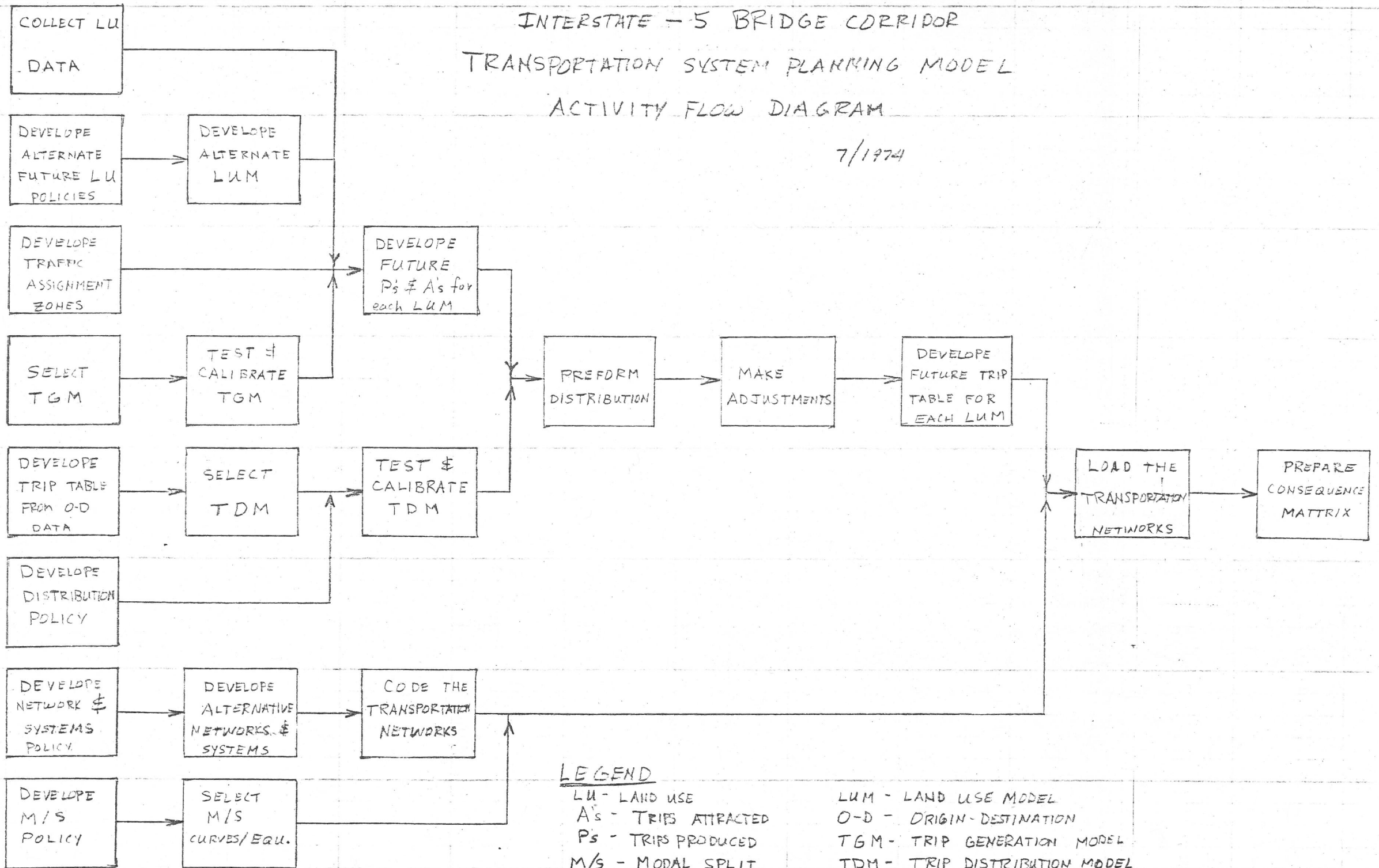
It was recommended that recommendations be grouped into categories of the basis of implementation to take place in either phase I or phase II.

The Chairperson of the Citizen Advisory Committee recommended that water transportation be given serious consideration in phase II. Staff presented a memo which briefly discussed the possibilities of a temporary ferry service across the Columbia River. The subcommittee recommended that staff contact the Washington ferry system to obtain information on the constraints involved in operating a ferry service.

The meeting adjourned at noon.

INTERSTATE - 5 BRIDGE CORRIDOR
TRANSPORTATION SYSTEM PLANNING MODEL
ACTIVITY FLOW DIAGRAM

7/1974





OREGON STATE HIGHWAY DIVISION

HIGHWAY BUILDING • SALEM, OREGON • 97310

TOM McCALL
GOVERNOR

July 22, 1974

F. B. KLABOE
Administrator of Highways

Mr. Lawrence A. Rice, Executive Director
Columbia Region Association of Governments
6400 S. W. Canyon Court
Portland, OR 97221

Dear Mr. Rice:

CRAG's May 2, 1974 submittal of proposed projects for inclusion in the "National Transportation Energy Conservation Action Plan" included an I-5 high-occupancy vehicle priority lane project. Our May 8 letter advised CRAG that we would investigate the possibility of providing such a lane on I-5.

Our Traffic Engineering Section has completed a preliminary analysis of the feasibility of providing priority lanes on the I-5 Interstate Bridge Corridor. This study covers the section of I-5 from the Interstate Bridge on the north to approximately Killingsworth Street on the south.

In brief, our analysis indicates that priority lanes for high-occupancy vehicles would not be practical. The analysis recommends consideration of a ramp-metering system in order to achieve the same goal for high-occupancy vehicles. Such a ramp-metering system would produce priority conditions for mass transit vehicles. A ramp-metering system in all probability would be less expensive, more efficient, and more workable than any type of priority lane system. It is acknowledged that ramp-metering will restrict the I-5 access of those motorists who live in the city and may not be an acceptable solution to this segment of the general public.


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COLUMBIA REGION ASS'N.
OF GOVERNMENTS

Mr. Lawrence A. Rice
July 22, 1974
Page 2

If CRAG concurs with the ramp-metering system, the State Highway Division is willing to do further investigative work to determine impacts, costs, and funding capabilities.

Very truly yours,



E. S. Hunter
Assistant State Highway Engineer

Attachment: Analysis of Priority Lanes for High
Occupancy Vehicles

OREGON STATE HIGHWAY DIVISION
Traffic Engineering Section
May 1974

ANALYSIS OF PRIORITY LANES FOR HIGH
OCCUPANCY VEHICLES

Interstate Bridge Corridor

A priority lane for high-occupancy vehicles has been proposed for the Interstate Bridge corridor in Vancouver and Portland. Following is a preliminary analysis of the feasibility of such a project.

The extent of the project was assumed to be from the Interstate Bridge on the north to approximately Killingsworth Street on the south. From the State Line to the Union Avenue Interchange, the Interstate 5 Freeway is six lanes in width. Through this interchange the freeway is four lanes wide. From here to the Interstate Avenue Interchange there are four through lanes plus a weaving lane in each direction. From the Interstate Avenue Interchange to the Lombard Street Interchange the freeway is four lanes wide. From Lombard Street to Portland Boulevard there are four through lanes plus a weaving lane in each direction. From there to Killingsworth Street the freeway is six lanes in width.

From the Interstate Bridge to the Columbia Slough Bridge the freeway is paved with asphaltic concrete. From there to Killingsworth Street the freeway is portland cement concrete with asphalt shoulders and median.

For the purposes of this analysis, it was assumed that a priority lane would be used only during the morning peak hour for southbound traffic. During other times, the lane would be open for all traffic. The assumption was also made that enforcement would not be a problem, and that suitable signing and channelizing devices could be developed for transition areas at the beginning and end of the priority lane.

Where a capacity analysis was necessary, it was based on level of service D. This results in operating speeds of 35 to 40 MPH, and is the highest volume that can be maintained for short periods of time without a high probability of breakdown in flow. Urban freeways are normally designed for a better level of service than this.

ALTERNATIVE I - Contra-Flow Lane

Conversion of the northbound left lane into a southbound priority lane would be very difficult on the Minnesota Freeway. On the four-lane sections there would be only one lane available for northbound traffic. The northbound lane would have a six-foot shoulder on structures and a ten-foot shoulder elsewhere. There would be no median shoulder. If a vehicle broke down on a structure, northbound traffic would be effectively blocked. If a bus or a car broke down anywhere in the priority lane, the lane would be completely blocked until a tow vehicle, traveling northbound, removed the stopped vehicle.

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COUNTY & CITY SECTION									
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Experience in other cities indicates that contra-flow bus lanes without a buffer lane results in bus speeds on the order of 35 to 40 MPH. This would be comparable to present peak-hour speeds over much of the Minnesota Freeway, and thus may not provide significant time savings.

Another difficulty with a contra-flow lane is that it would not be possible to exit from the lane except at the terminus. Since 40 percent of the southbound traffic on the Interstate Bridge exits at Union Avenue or Interstate Avenue, this would substantially reduce the attractiveness of the priority lane to car pools.

To estimate the net change in energy usage and travel time for this alternative, it is also necessary to investigate the northbound traffic flows during the AM peak period. On the Interstate Bridge, there are about 2,000 northbound vehicles between 7:00 A.M. and 8:00 A.M. This could easily be handled by two northbound lanes, which would have a capacity for level of service D of 2,800. In the four-lane sections, the demand for the single northbound lane would be 2,200 vehicles, but the level of service D capacity would be only 1,100 vehicles. This would result in massive congestion for northbound traffic, with the attendant increase in energy consumption.

ALTERNATIVE II - Concurrent Flow in Exclusive Lane

This proposal would involve restriping the southbound lanes to provide an additional southbound lane to be used as a priority lane. The pavement width on the four-lane sections varies from 36 feet to 40 feet. This would require that the entire width, from the median barrier to the curb, be used for travel lanes, with no shoulder on either side. The existing two travel lanes, however, are concrete with an asphalt median and shoulder which are not designed for heavy traffic. Modification of the median and shoulder to support through traffic would require major reconstruction, and an overlay would be required on the concrete before the striping could be changed.

Weaving movements would present a serious operational problem with this type of priority lane. If the median lane was used as the priority lane, high-speed priority vehicles would have to weave through two or three lanes of congested slow-moving traffic to reach freeway exits. If exiting from the priority lane was not permitted, this would eliminate the 40% of the vehicles exiting at Union Avenue and Interstate Avenue, plus those exiting at Jantzen Beach and Portland Boulevard.

If the right lane was used as the priority lane, all other vehicles would have to weave through the priority lane to enter or exit from the freeway.

ALTERNATIVE III - Concurrent Flow on Shoulder (buses only)

The primary problem with this alternative is that on the freeway structures, the shoulders are only six feet in width. To obtain a shoulder of adequate width, it would be necessary to eliminate the median shoulder and move the through traffic lanes over to the median barrier. As in Alternative II, this would require shoulder reconstruction and asphalt overlays of the existing concrete.

There would also be a weave problem. Traffic would be required to weave through the bus lane to enter or exit from the freeway. This would create a safety hazard as well as reduce the speed of the buses.

ALTERNATIVE IV - Convert Left Lane to Priority Lane

An additional possibility is to use the left southbound lane as a priority lane. In the four-lane section, this would leave one lane for other southbound traffic.

On the four-lane section north of Lombard Street, the present southbound peak-hour demand is about 3,300 vehicles per hour. About four percent of these vehicles, or 130, contain three or more occupants and would therefore be priority vehicles. This leaves about 3,170 vehicles to travel in the right lane, which has a capacity of about 1,100 vehicles. If any energy savings are to be realized, which is the objective of this project, enough people must be diverted to buses or car pools to reduce the traffic demand in the right lane to about 1,100 vehicles. This would require that either 690 additional car pools be formed (an increase of 430%), or 1,660 people be diverted to buses (an increase of 1730%), or some combination thereof. It is questionable whether these results could ever be attained.

There is also the weave problem; a median priority lane would require that priority vehicles weave through slow-moving traffic to reach freeway exits.

SUMMARY

The basic problem in developing a priority lane of any type on the Minnesota Freeway is that it is only four lanes in width over much of its length. This makes it nearly impossible to reserve an existing lane or a restriped lane for priority use. There is no known four-lane freeway anywhere in the United States with a priority lane existing or planned.

Because physical conditions preclude a low-cost priority lane, it is strongly recommended that a freeway ramp-metering system be investigated. Such a system could accomplish all that a priority lane could, and could provide additional benefits. Some of the advantages of a ramp-metering system are the following:

1. Bypass lanes could be provided around the ramp signals, so that buses and carpools could immediately enter the freeway, while all other cars would have to wait in line. This would provide an incentive for people to form car pools or use buses.
2. Buses and carpools could be guaranteed a high-speed freeway trip, because the ramp-metering system would prevent the traffic flow from approaching the capacity of the freeway. The rate of ramp-metering could be varied to provide any desired freeway speeds.
3. Park-and-ride stations could be provided adjacent to the freeway, with exclusive ramps to the freeway without metering.

4. Experience with ramp-metering in other cities indicates that freeway traffic accidents are usually significantly reduced.
5. Through trucks and cars are not penalized by the metering, because they are already on the freeway as they enter the urban area.
6. Commuters who live in the city and are divertable to buses or carpools are encouraged to do so, because in their private cars they are delayed by ramp metering. Commuters who live in the freeway corridor but at long distances from the urban area, where carpooling is difficult and mass transit non-existent, are not delayed on metered ramps because they are on the freeway as they enter the urban area.

A ramp-metering system in the Interstate Bridge corridor would probably be cheaper, more efficient, and more workable than any type of priority lane system.

TL:pb
5/28/74