## **COLUMBIA REGION ASSOCIATION of GOVERNMENTS**

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December 23, 1975

I-5 Project Task Force

John Krawczyk

Meeting



City of Portland Bureau of Planning

The I-5 Project Task Force meeting has been rescheduled for 3 p.m. on Tuesday, December 30. The meeting will be held in the Commissioner's Conference Room at the Clark County Courthouse in Vancouver.

JK:nf:2/2

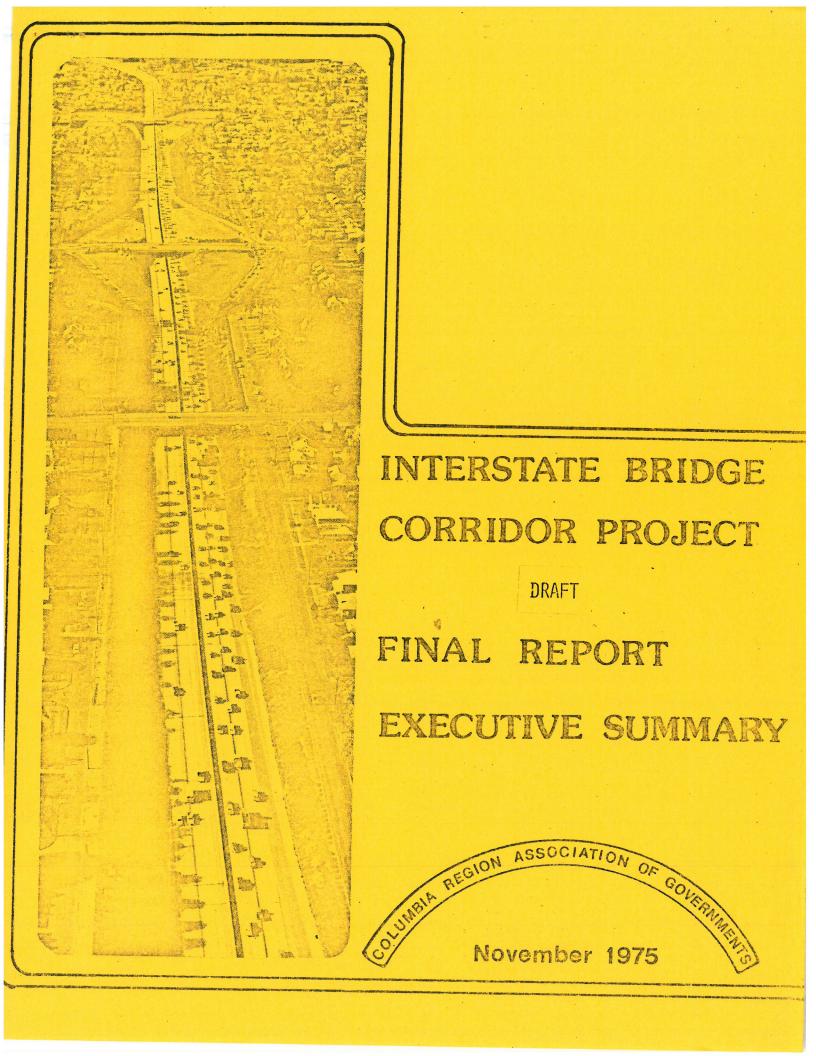
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# COLUMBIA REGION ASSOCIATION OF GOVERNMENTS GENERAL ASSEMBLY

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The preparation of this report has been financed in part by funds from the United States Department of Transportation, Urban Mass Transportation Administration, under the Urban Mass Transportation Act of 1964 as amended; and by funds from the Oregon Department of Transportation, the Washington State Department of Highways, the City of Vancouver, Clark County, the City of Portland, Multnomah County and Tri-Met.

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## PROJECT TASK FORCE

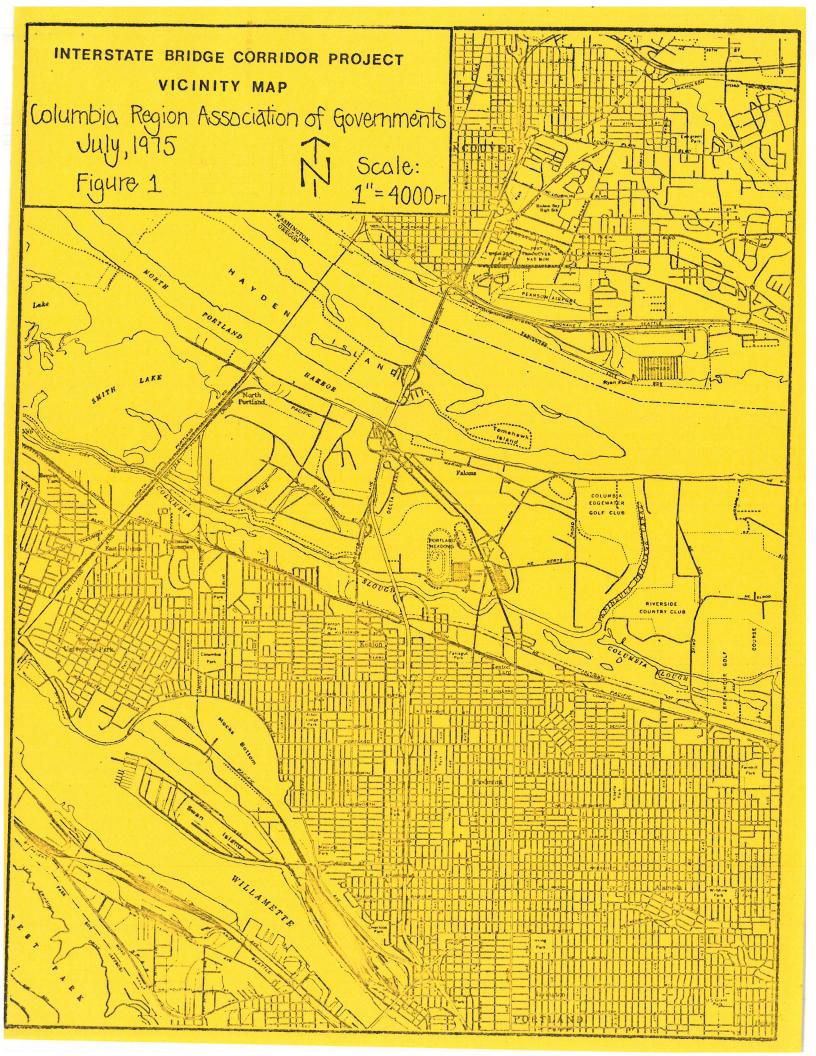
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#### INTRODUCTION

This executive summary has been prepared to convey essential information obtained by the Interstate Bridge Corridor Project as well as the project's recommendations. Detailed information regarding findings and background material is contained in the Technical Analysis of the final report.

It is anticipated that decision makers and other interested parties will find this summary useful in obtaining a general understanding about the critical transportation problems in the corridor as well as the means which may be undertaken to address these problems.

The Interstate Bridge Corridor project was formed in late 1973 to address the problems of severe traffic congestion that had become a frequent occurance on the I-5 Freeway between Vancouver and Portland. Since the corridor affects a number of jurisdictions including two states, two cities and two counties, a special interagency project was formed to analyze the conditions and present recommendations for improvement. In addition, four transit operators provide service within or near this transportation corridor. The project was designed to address the time period before I-205 becomes operational.

Traffic congestion in the Interstate Bridge corridor has become a critical problem for several reasons. First, I-5 is the major north-south Interstate Highway on the Pacific Coast. Substantial volumes of interregional traffic are carried by this highway. Second, this freeway is an important commuter route within the Portland-Vancouver Metropolitan area; each day, thousands of commuters use I-5 to reach their places of work. Finally, I-5 is important because it represents the only highway crossing of the Columbia River in the Portland Metropolitan area. People traveling between Clark County, Washington and the remainder of the metropolitan area have no choice except to use the I-5 corridor for travel between the two states. Traffic congestion in the corridor disrupts commercial, social and recreational travel in the urban area, as well as the north or south-bound interregional travel.

Traffic conditions in the corridor were examined during phase one of the project. The Phase I Report identified a number of low-cost, short term improvements which may be implemented quickly to provide a degree of immediate relief in the corridor. A sum-

mary of these recommendations is contained in the next section. This final report deals with capital intensive improvements to permanently alleviate the congested traffic conditions in the corridor. In particular, these improvements include upgrading of the transit service in the corridor and implementation of a system of priority treatment for high occupancy vehicles (buses and carpools) on Interstate 5.

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#### RECOMMENDATIONS

- 1. A coordinated public transit system should be developed in the Interstate Bridge Corridor to provide a convenient, inexpensive and attractive transit service between Clark County, Vancouver and Portland.
- 2. Tri-Met should purchase Vancouver-Portland Bus Company immediately.
- 3. Oregon State Department of Transportation should install priority treatment measures as follows (figure 5):
  - A. Add a HOV lane on I-5 in both directions between the Fremont Bridge and Hayden Island.
  - B. Ramp control at Hayden Island on-ramps with bypasses for HOV.
  - C. In cooperation with the Oregon State Police, review the costs and benefits of installing and operating a closed circuit TV system for surveillance of freeway operations on I-5 north.
- 4. Oregon State Department of Transportation reconstruct the Columbia Slough Bridge to an eight lane structure.
- 5. The Oregon Department of Transportation install a traffic signal at the terminus of the northbound I-5 off-ramp at Portland Boulevard

These recommendations should assist in the attainment of certain regional transportation goals such as conservation of fuel, improved safety, reduction of traffic congestion and improvement of regional air quality. Certain capital and operating costs will be incurred in the implementation of these recommendations.

These costs could be funded as follows:

Transit service in Clark County - Household utility tax, UMTA operating funds and state motor vehicle excise tax matching funds (if available).

Corridor service - UMTA operating funds: priority treatment.

Slough Bridge and signal - Interstate funds.

Action on some of these recommendations has already been taken. A public transportation improvement conference has been held in

Vancouver. It concluded that transit in the county should be provided through inter-governmental contracts between the City of Vancouver, Clark County and other cities interested in obtaining transit service.

The City of Vancouver and Clark County have approved a joint resolution supporting public acquisition of Vancouver-Portland Bus Company. Tri-Met is currently studying the legal and financial aspects of acquisition and operation of this line.

The City of Vancouver has agreed to purchase ten new diesel buses. The purchase of these buses is essential to the implementation of any city-county agreement to provide transit service outside the city limits of Vancouver.

## PHASE 1 FINDINGS AND RECOMMENDATIONS

Phase I of the I-5 project included extensive study of traffic conditions in the I-5 corridor. A number of traffic operation problem areas were identified. In addition, it was found that the present transit systems operating in the corridor were severely fragmented resulting in high costs and time consuming transfers to commuters. Air, water, rail and highway systems were considered as possible means of solving some of the traffic problems as well as socio-economic means of reducing travel demand. It was concluded by the Task Force that only highway and transit improvements could be implemented within a short period of time at a fairly low cost.

Briefly, the Task Force recommendations included: 1) Express bus service in the corridor. The project recommended that the Vancouver-Portland Bus Company operate a demonstration express commuter bus service from Hazel Dell and the Mill Plain corridor to Lloyd Center and downtown Portland. 2) Inter-system transfers. It was recommended that Tri-Met, Vancouver-Portland Bus Company, Vancouver Transit and Evergreen Stage Lines honor each others transfers. 3) Consumer information service. Suggested improvements include: toll free information service, route maps, shelters and information brochures. 4) Expansion of the regional car pool program. It was recommended that the ODOT regional car pool program be expanded to include Clark County. 5) Evaluation of priority treatment for high occupancy vehicles. This recommendation called for detailed evaluation of priority treatment for high occupancy vehicles (HOVs) including priority lanes and ramp metering with bypasses for Interstate bikeway. Completion of a bikeway through the Interstate Bridge corridor from downtown Portland to Vancouver was recommended. 7). Highway operations. This recommendation called for highway safety improvements, signalization, ramp metering, utilization of the shoulder in limited areas to improve traffic flow and use of dynamic warning signs to advise motorists of congested conditions. 8) Analysis of long term improvements. These included proposed studies of a transit system. This recommendation called for study and development of a transit district in Clark County and purchase of the Vancouver - Portland Bus Company by Tri-Met.

Many of the above recommendations have been implemented to date. This report is in fact, the result of two recommendations; namely,

evaluation of priority treatment, and study of a transit district of Clark County. The demonstration express bus service has been successful in attracting new patrons to bus service. However, Vancouver-Portland Bus Company reports that the service is continuing to operate at a loss. Some of the service originally instituted has been curtailed for lack of ridership. The regional car pool program has been expanded to Clark County. Marketing efforts were conducted and car pool officials reported limited response to the program. Some traffic operation improvements are in the planning stage by the Oregon Department of Transportation. Many improvements are planned in conjunction with the reconstruction of the Columbia Slough Bridge and Union Avenue Interchange. The improvements relating to the information program, inter-system transfers and bikeway, have not been implemented. Long range system considerations will be studied at a later date as part of the regular CRAG work program. Traffic operation improvements of particular importance which have not been implemented or studied are noted in this reports' recommendations.

#### TRANSIT SERVICE

An effective transit system can provide a realistic alternative to the automobile. This is important in the I-5 corridor. If commuters can be encouraged to switch from their autos to transit, some decrease in the amount of traffic congestion can be expected. In addition, this more efficient means of travel reduces energy consumption and air pollution while increasing highway safety.

It is generally recognized that publicly owned transit systems can provide a higher service level than can private systems. Public systems can reduce fares and operate high service levels because the public system can use tax subsidies to make up operating deficits. The private system cannot obtain subsidies and is dependent on farebox revenues.

In order to improve transit service in this corridor, it is necessary to purchase the private transit service currently operating in the corridor and form a public transit system in Clark County. A Clark County system will support the service operating in the corridor by providing a transit feeder system to the corridor service.

Public transit districts, encompassing an entire metropolitan area, have been a reality in Oregon since 1969. The Tri-County Metropolitan District (Tri-Met) in the Portland area was formed under legislation which permits the creation of special purpose districts to provide transit service. However, Washington law has been amended only recently to permit jurisdictions, other than cities to fund and provide transit service.

The 1975 Washington Legislature amended Washington Law to modify the manner in which public transit is funded and administered. Under the revised legislation, transit districts larger than an individual city but smaller than a county are permitted. These districts are to be formed by action of a public transit improvement conference, which is an official body composed of representatives from a given county and the cities therein.

Transit service can now be financed by a household utility tax, a business and occupation tax or a retail sales tax at the rate of .1, .2, or .3 of one percent. The household utility tax and business and occupation tax can be used in combination with each other, the sales tax must be used alone. Imposition of any of these taxes requires a vote of the people. Receipts from the business tax and the utility tax may be matched by receipts from the state's motor vehicle excise tax.

The approval of this legislation provides Clark County with a variety of means of organizing financing and implementing transit service. The Task Force makes no specific recommendations on how

the service should be organized or funded. However, a transit system which would provide reasonable degrees of relief in the corridor needs a feeder system which is carefully coordinated with the operation of corridor service and which can serve populous areas with the urban service boundary. Development of a new system should carefully consider these factors.

The laws of both Oregon and Washington permit public transit agencies to contract with other transit agencies, public or private, to provide service. Therefore, it is possible for a Washington agency to contract with an Oregon system, such as Tri-Met, to provide all or part of its service. If a service contract is developed, it would be necessary for Washington agencies to subsidize any operating losses incurred by Tri-Met. Possible service arrangements are noted in the technical summary (see figure III-5).

A contractual service arrangement with Tri-Met has particular applicability in the I-5 Corridor between Vancouver and Portland. Service would be operated in an area not totally within the boundaries of any single transit district, city, or county or benefit area. This arrangement would permit an even distribution of the service costs on the basis of benefits received.

To assist in the implementation of a transit system in Clark County, the I-5 project has developed a transit planning information base for Clark County. The project staff's work has centered in four areas including service criteria, identifying types of service which may be operated in Clark County, estimating system operation and capital costs, and noting sources of and estimated revenue. Specific bus routings or identification of a service area have been avoided as these considerations are policy decisions which will be made at the County's Public Transportation Improvement Conference and the resulting planning efforts.

Planning efforts have identified six types of transit service which can be operated in Clark County. These included Arterial Service, Local Service, Intercity Service, Corridor Service, Shuttles and Special Transportation.

Arterial service is designed to operate on arterial highways. This service provides fast service at reasonably frequent intervals from residential communities and neighborhoods to the Vancouver central business district. Extra buses are provided during the peak periods to handle the demand created by commuters traveling to and from work.

Local service offers transportation to people dependant on the transit system for their travel needs. Local service emphasizes coverage and provides transportation to a variety of destinations. Dial-a-bus systems or other forms of "demand responsive transit" may be used to provide "door to door" service.

Intercity service provides transportation between the similar cities of Clark County and the Vancouver CBD. Service is scheduled according to need and may be operated on an hourly, daily or even a weekly basis.

Corridor service offers transportation between the downtown areas of Vancouver and Portland. The purpose of corridor service is to provide a fast, inexpensive alternative to automobile travel in the Interstate Bridge Corridor, encouraging commuters to use transit. Corridor service should utilize exclusive lanes described in the latter part of this report.

Shuttles are designed to transport workers to concentrated employment centers where there is a common starting and ending time. Factory shift changes, for example, can be effectively served by shuttles.

Special Transportation serves people unable, due to physical handicaps, to drive automobiles or board conventional transit buses. Provision of special transportation services is required by federal regulations and encouraged by CRAG policies.

The system will incur a number of capital expenditures in order to provide a high level of service. New buses must be purchased, a maintenance facility must be constructed and system amenities such as transit stations and bus shelters should be provided.

Operating expenses include those expenditures necessary to operate, service and administer the transit system. Current operating expenses of existing systems indicate that an operating cost of between \$14 and \$18 per bus hour\* should be expected.

The service categories have been combined in two scenarios to illustrate examples of the type of service which could be provided for a given level of funding. Scenario One illustrates the moderate level of service within the Vancouver urban area with connections to Camas and Washougal. Operating expenses are anticipated to run approximatley \$1.1 million per year and capital expenditures are estimated at \$2.2 million\*. Scenario Two portrays a countywide transit system for about \$2.2 million in operating expenses and a \$6.6 million\* outlay. These scenarios are not recommendations but were developed as illustrations of the kind of service that is available for a particular cost. There are any number of detailed service possibilities between these two alternatives.

<sup>\*</sup> The cost of operating one bus for one hour

<sup>\*</sup> This represents the total capital costs. Federal funding can be expected to pay 80% of the capital cost. Therefore, the local share is estimated at \$440,000 for Scenario One and \$1.3 million for Scenario Two.

#### PRIORITY TREATMENT

To encourage commuters to make more efficient use of vehicles traveling the I-5 corridor and, therefore, increase the "passenger capacity" of the freeway, it has been recommended that incentives be provided to persons using transit and carpools. These incentives are designed so that persons using buses and carpools can bypass traffic conqestion and arrive at their destinations more quickly than if they had traveled alone. The task force studied two kinds of priority treatment including an exclusive lane for HOV's (High Occupancy Vehicles -Buses and Carpools) and ramp control. The exclusive lane is a freeway lane on which use is restricted to HOV's. Ramp control is a method by which entrance to the freeway is restricted during those times when the freeway becomes congested. HOV's are permitted to bypass the control device without restriction. By encouraging the more efficient use of vehicles, ramp control and exclusive lanes will help reduce the overall level of traffic congestion on the affected highway. nical analysis indicated that an express lane would double the number of carpools and transit ridership using the I-5 freeway. Increasing the number of carpools and transit usage, in turn, reduces the number of autos traveling on the freeway, thus reducing congestion.

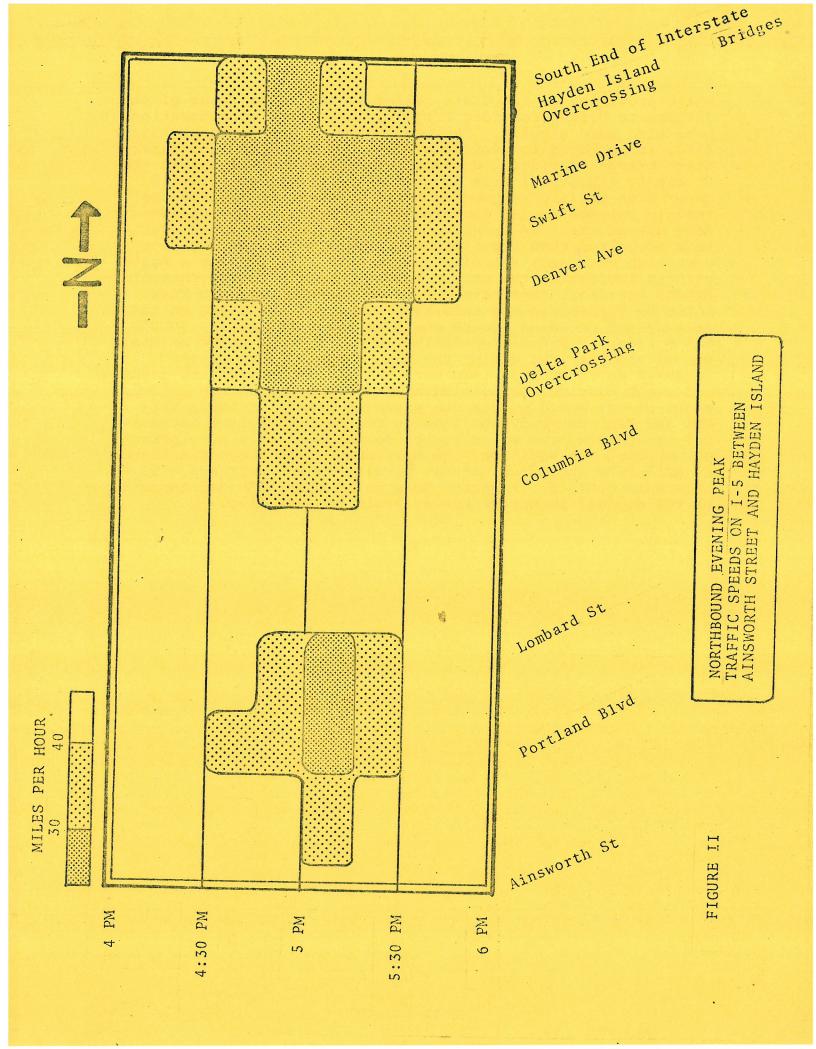
An exclusive lane on the I-5 freeway could be provided with only minor reconstruction by using narrower lanes and a portion of the existing shoulder. The present highway shoulders could be reduced and the existing lanes narrowed slightly (to about 11') to provide another lane. The additional lane would be reserved for buses and carpools.

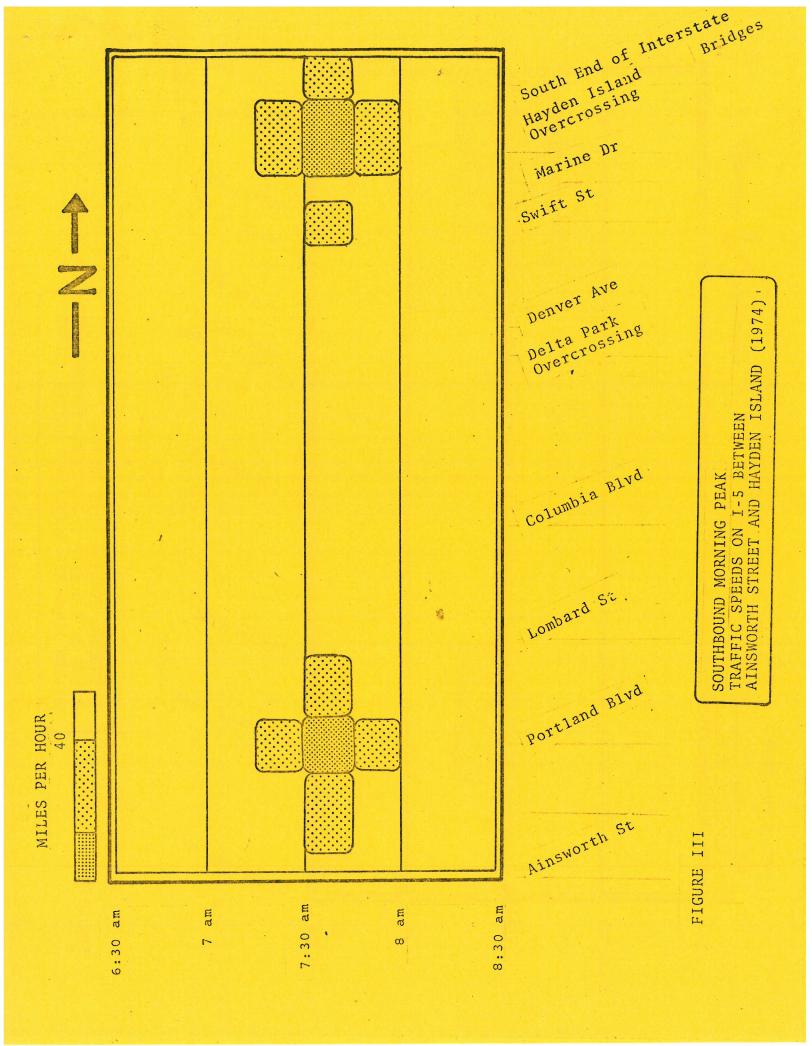
The cost and benefits of a closed circuit monitoring system should be studied. Such a system could be useful, not only in detecting violators, but also in helping to spot traffic accidents and other conditions which disrupt freeway operations.

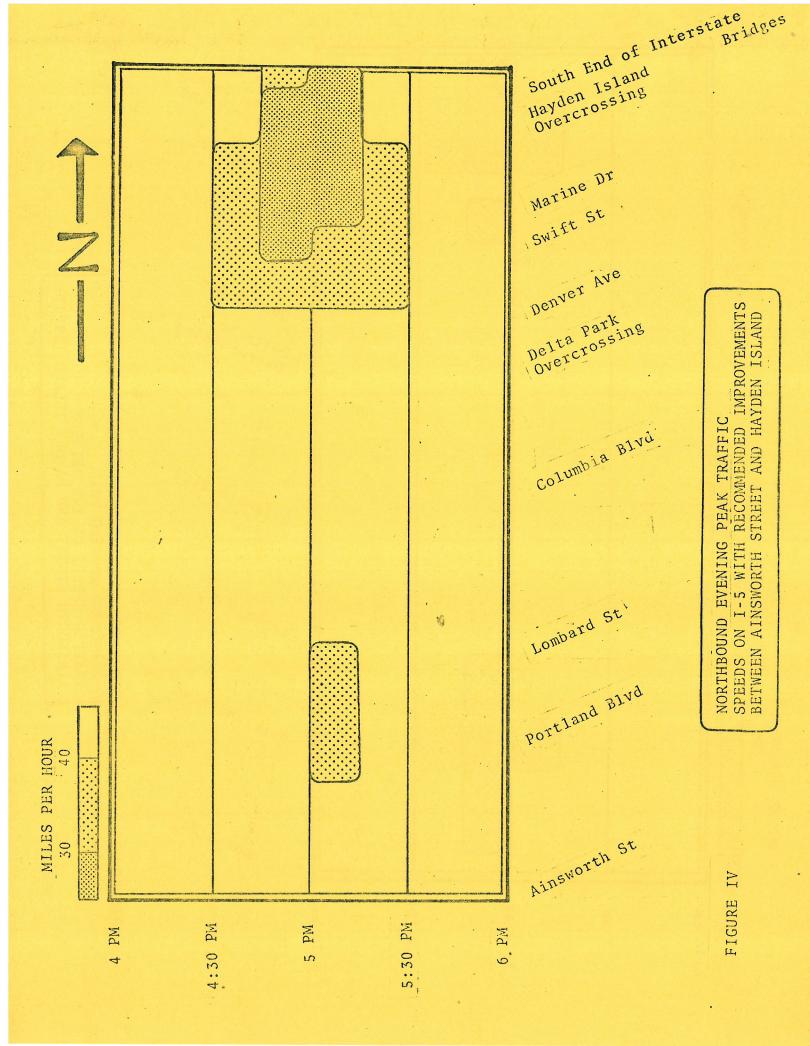
An analysis was conducted which showed that congestion was significantly reduced with the implementation of an exclusive lane, ramp control and other improvements. In addition, improvements were realized in air pollution, energy conservation and safety. The greatest improvement occurred in the evening peak period.

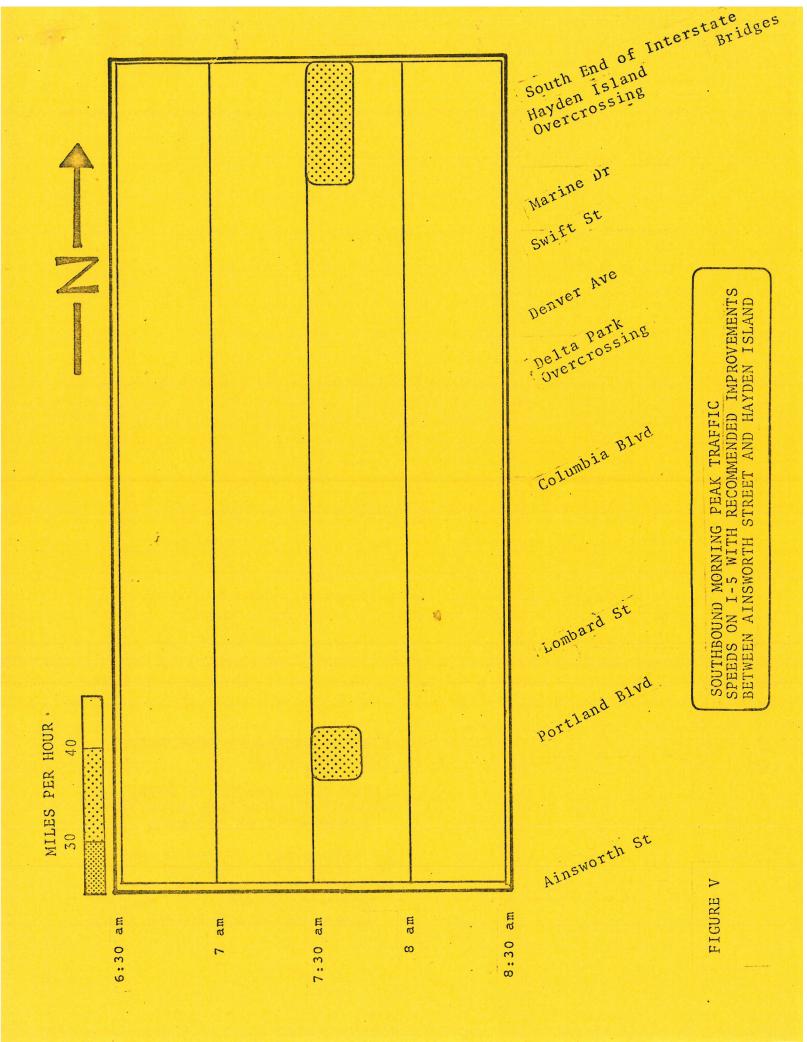
The improvements recommended herein will significantly augment the operations of the traffic flow. This is illustrated by comparing the existing conditions northbound (figure 2) and southbound (figure 3) with the expected operational conditions shown on figures 4 and 5. The detailed study material is contained in the Technical Analysis.

While provision of immediate relief is the major focus of the Interstate Bridge Corridor Project, long range considerations have also been studied. The completion of I-205 shortly after 1980, is expected to provide a degree of relief in the interstate bridge corridor. However, continued development in the Rivergate industrial area as well as in Clark County, will cause high traffic volumes on the I-5 freeway. By 1990 the traffic volumes in I-5 are expected to equal or exceed present day counts. In order to avoid traffic conditions even more congested than those currently experienced on the freeway, high occupancy vehicles (HOVs) will have to play a major role in increasing the people moving capacity of the interstate bridge corridor. Estimates prepared by the Governors Task Force on Transportation show that bus lanes operating on the freeway and on Union Avenue could carry approximatley 30,000 daily riders. Transit operating on the freeway could maintain one minute headways during the peak periods, five minute headways during the daytime off peak and 30 minutes for evening and night service. Provision of bus lanes within the existing right-of-way would enable the planning staffs of ODOT, Tri-Met and WSHD to study the impacts of the low capital intensive HOV priority system prior to the development of a more permanent busway. In addition, the bus lanes would provide a means of gradually upgrading transit service in the corridor. Thus, ridership could be increased to a point where the development of the capital intensive busway would be justified.









STAFF PRINCIPALLY RESPONSIBLE FOR THIS REPORT

LARRY RICE, EXECUTIVE DIRECTOR, RICHARD ETHERINGTON, DIRECTOR, TRANSPORTATION DIVISION

A. REED GIBBY, SENIOR PLANNING WILLIAM PETTIS, PLANNER PROJECT PRODUCTION--- KAREN THACKSTON, LORI WOLCOTT, LESLIE SMITH AND ZONNIE BAUER

## COLUMBIA REGION ASSOCIATION of GOVERNMENTS

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#### **AGENDA**

INTERSTATE BRIDGE CORRIDOR PROJECT TASK FORCE COMMISSIONER'S CONFERENCE ROOM CLARK COUNTY COURTHOUSE

3:00 P.M., TUESDAY, DECEMBER 16, 1975

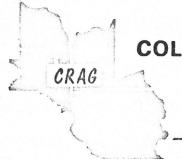
- I. Call to Order
- II. Status Report
- III. Review of Project Reports
- Other Business IV.
- Adjourn V.

JK:1s

3:10



City of Portland Bureau of Planning



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ASSOCIATE MEMBERS

**CLARK COUNTY** Camas Vancouver

Columbia City

Scappoose St. Helens The Port of Portland Tri-Met The State of Oregon

MEMORANDUM

December 9, 1975

I-5 Project Task Force To:

John Krawczyk From:

Bureau of Planning Subject: Status of Project Recommendations

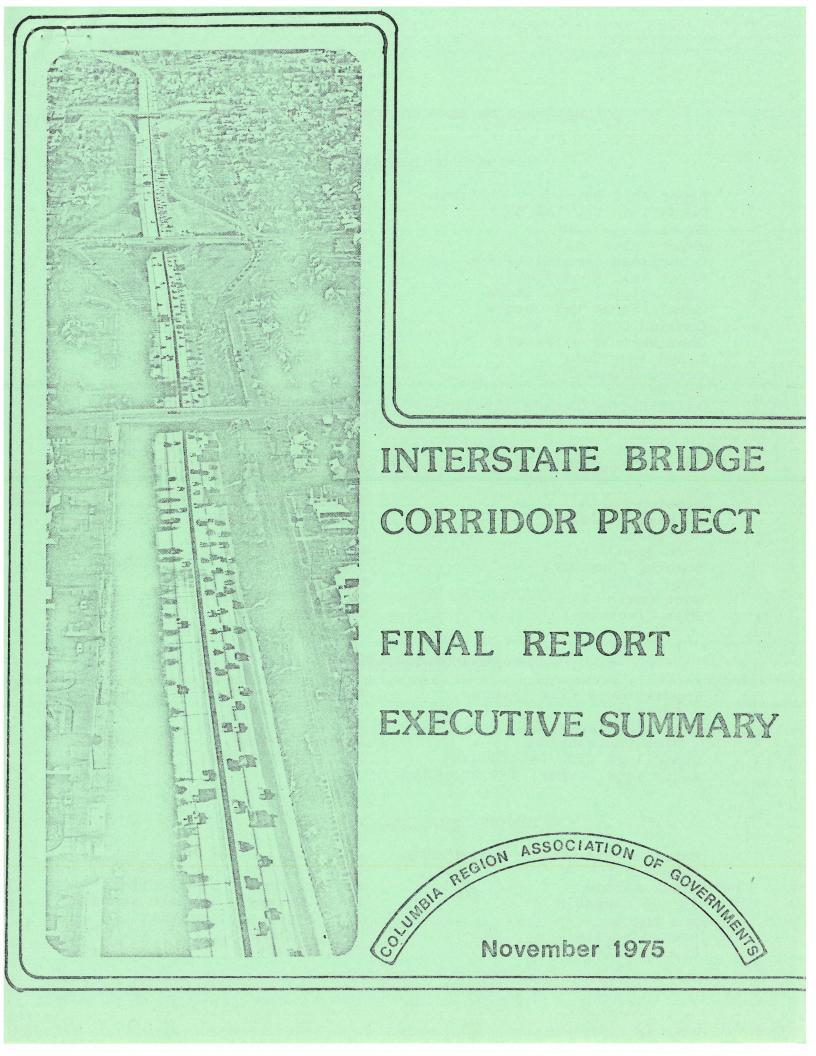
This is to advise you of the status of the recommended improvements noted in the draft of the final Interstate Bridge Corridor project report. Recommendation 1 called for the establishment of a coordinated public transit system in Clark County and in the Interstate Bridge Corridor. A public transportation improvement conference to assist in the establishment of this unified public transit system, has been held. It was decided by participants of the conference to support provision of transit service in the county through inter-governmental contract. Therefore, the transit service will be provided by agreements between Clark County, the City of Vancouver, and other cities and agencies interested in providing or receiving the benefits of transit service.

The City of Vancouver has decided to purchase ten new diesel buses to replace the worn-out equipment currently operated by the City. Purchase of this equipment is essential to the extension of transit service to areas outside the city limits.

Clark County and the City of Vancouver have approved a joint resolution supporting the concept of a unified transit system for public transit service in the Interstate Bridge Corridor. The resolution calls upon appropriate agencies to develop proposals for acquisition and operation of Vancouver-Portland Bus Company a) Tri-Met, b) the City of Vancouver, c) Clark County, d) a private operator under contract with any combination of the above, and e) a combination of the above arrangements. The City and the County will review the proposals and make a decision to select the best alternative at a later date.

JK:ls

2:14



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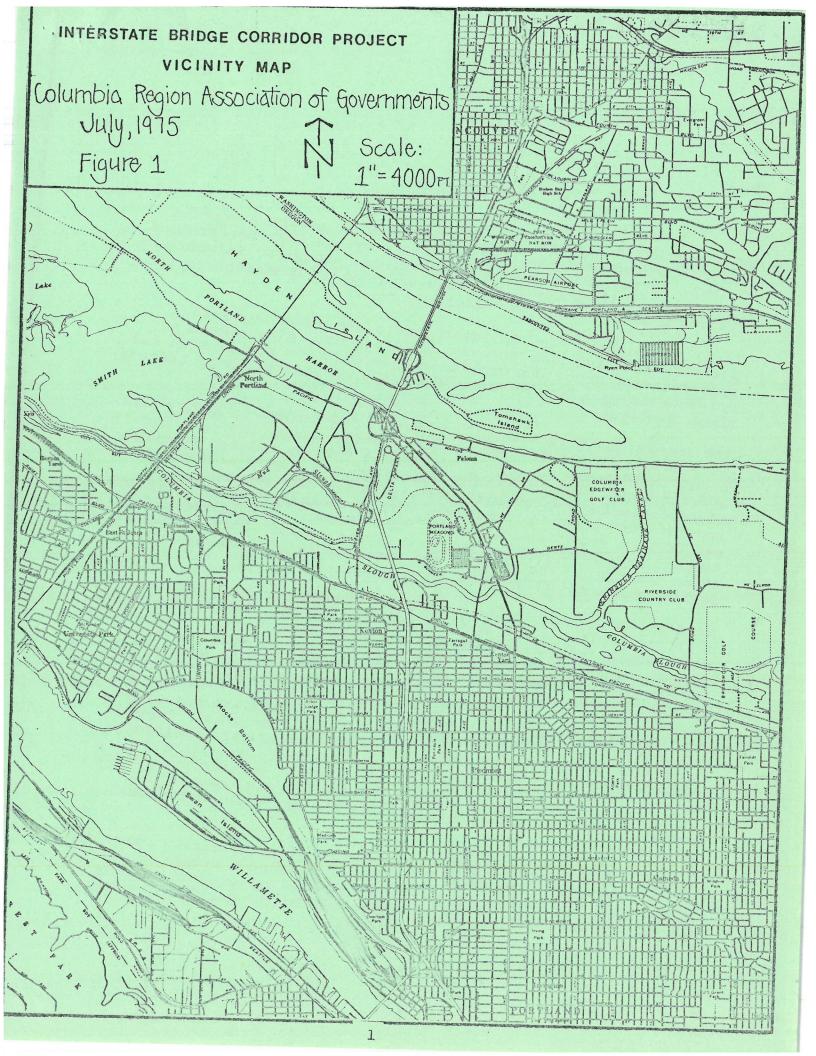
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Councilman Dick Pokornowski
Jerry Peck, Owner, V-P Bus Company

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Susan Regan Vern River Betsy Strong Richard Swennes Ben Witt



## INTRODUCTION

This executive summary has been prepared to convey essential information obtained by the Interstate Bridge Corridor Project information obtained by the Interstate Bridge Corridor Project information. Detailed information as well as the project's recommendations. Detailed information as well as the project's recommendations is contained in the regarding findings and background material is contained in the Technical Analysis of the final report.

It is anticipated that decision makers and other interested parties will find this summary useful in obtaining a general understanding about the critical transportation problems in the corridor as well as the means which may be undertaken to address these problems.

The Interstate Bridge Corridor project was formed in late 1973 to address the problems of severe traffic congestion that had to address the problems of severe traffic congestion that had become a frequent occurance on the I-5 Freeway between Vancouver become a frequent occurance on the I-5 Freeway between Vancouver and Portland. Since the corridor affects a number of jurisdictions including two states, two cities and two counties, a tions including two states, two cities and two counties, a second interagency project was formed to analyze the conditions special interagency project was formed to analyze the condition, four and present recommendations for improvement. In addition, four and present recommendations for within or near this transportance transit operators provide service within or near this transportation corridor. The project was designed to address the time ation corridor. The project was designed to address the time

Traffic congestion in the Interstate Bridge corridor has become a critical problem for several reasons. First, I-5 is the major north-south Interstate Highway on the Pacific Coast. volumes of interregional traffic are carried by this highway. Second, this freeway is an important commuter route within the Portland-Vancouver Metropolitan area; each day, thousands of commuters use I-5 to reach their places of work. Finally, I-5 is important because it represents the only highway crossing of the Columbia River in the Portland Metropolitan area. traveling between Clark County, Washington and the remainder of the metropolitan area have no choice except to use the I-5 Traffic congestion corridor for travel between the two states. in the corridor disrupts commercial, social and recreational travel in the urban area, as well as the north or south-bound interregional travel.

Traffic conditions in the corridor were examined during phase one of the project. The Phase I Report identified a number of low-cost, short term improvements which may be implemented quickly to provide a degree of immediate relief in the corridor. A sum-

mary of these recommendations is contained in the next section. This final report deals with capital intensive improvements to permanently alleviate the congested traffic conditions in the corridor. In particular, these improvements include upgrading of the transit service in the corridor and implementation of a system of priority treatment for high occupancy vehicles (buses and carpools) on Interstate 5.

#### RECOMMENDATIONS

- A coordinated public transit system should be developed in the Interstate Bridge Corridor to provide a convenient, inexpensive and attractive transit service between Clark County, Vancouver and Portland.
- 2. Tri-Met should purchase Vancouver-Portland Bus Company immediately.
- 3. Oregon State Department of Transportation should install priority treatment measures as follows (figure 5):
  - A. Add a HOV lane on I-5 in both directions between the Fremont Bridge and Hayden Island.
  - B. Ramp control at Hayden Island on-ramps with bypasses for HOV.
  - C. In cooperation with the Oregon State Police, review the costs and benefits of installing and operating a closed circuit TV system for surveillance of freeway operations on I-5 north.
- 4. Oregon State Department of Transportation reconstruct the Columbia Slough Bridge to an eight lane structure.
- 5. The Oregon Department of Transportation install a traffic signal at the terminus of the northbound I-5 off-ramp at Portland Boulevard

These recommendations should assist in the attainment of certain regional transportation goals such as conservation of fuel, improved safety, reduction of traffic congestion and improvement of regional air quality. Certain capital and operating costs will be incurred in the implementation of these recommendations.

These costs could be funded as follows:

Transit service in Clark County - Household utility tax, UMTA operating funds and state motor vehicle excise tax matching funds (if available).

Corridor service - UMTA operating funds: priority treatment.

Slough Bridge and signal - Interstate funds.

Action on some of these recommendations has already been taken. A public transportation improvement conference has been held in

Vancouver. It concluded that transit in the county should be provided through inter-governmental contracts between the City of Vancouver, Clark County and other cities interested in obtaining transit service.

The City of Vancouver and Clark County have approved a joint resolution supporting public acquisition of Vancouver-Portland Bus Company. Tri-Met is currently studying the legal and financial aspects of acquisition and operation of this line.

The City of Vancouver has agreed to purchase ten new diesel buses. The purchase of these buses is essential to the implementation of any city-county agreement to provide transit service outside the city limits of Vancouver.

## PHASE 1 FINDINGS AND RECOMMENDATIONS

Phase I of the I-5 project included extensive study of traffic conditions in the I-5 corridor. A number of traffic operation problem areas were identified. In addition, it was found that the present transit systems operating in the corridor were severely fragmented resulting in high costs and time consuming transfers to commuters. Air, water, rail and highway systems were considered as possible means of solving some of the traffic problems as well as socio-economic means of reducing travel demand. It was concluded by the Task Force that only highway and transit improvements could be implemented within a short period of time at a fairly low cost.

Briefly, the Task Force recommendations included: 1) Express bus service in the corridor. The project recommended that the Vancouver-Portland Bus Company operate a demonstration express commuter bus service from Hazel Dell and the Mill Plain corridor to Lloyd Center and downtown Portland. 2) Inter-system transfers. It was recommended that Tri-Met, Vancouver-Portland Bus Company, Vancouver Transit and Evergreen Stage Lines honor each others transfers. 3) Consumer information service. gested improvements include: toll free information service, route maps, shelters and information brochures. 4) Expansion of the regional car pool program. It was recommended that the ODOT regional car pool program be expanded to include Clark County. 5) Evaluation of priority treatment for high occupancy vehicles. This recommendation called for detailed evaluation of priority treatment for high occupancy vehicles (HOVs) including priority lanes and ramp metering with bypasses for 6) Interstate bikeway. Completion of a bikeway through HOVs. the Interstate Bridge corridor from downtown Portland to Vancouver was recommended. 7). Highway operations. This recommendation called for highway safety improvements, signalization, ramp metering, utilization of the shoulder in limited areas to improve traffic flow and use of dynamic warning signs to advise motorists of congested conditions. 8) Analysis of long term improvements. These included proposed studies of a transit system. This recommendation called for study and development of a transit district in Clark County and purchase of the Vancouver - Portland Bus Company by Tri-Met.

Many of the above recommendations have been implemented to date. This report is in fact, the result of two recommendations; namely,

evaluation of priority treatment, and study of a transit district of Clark County. The demonstration express bus service has been successful in attracting new patrons to bus service. However, Vancouver-Portland Bus Company reports that the service is continuing to operate at a loss. Some of the service originally instituted has been curtailed for lack of ridership. The regional car pool program has been expanded to Clark County. Marketing efforts were conducted and car pool officials reported limited response to the program. Some traffic operation improvements are in the planning stage by the Oregon Department of Transportation. Many improvements are planned in conjunction with the reconstruction of the Columbia Slough Bridge and Union Avenue Interchange. The improvements relating to the information program, inter-system transfers and bikeway, have not been implemented. Long range system considerations will be studied at a later date as part of the regular CRAG work program. Traffic operation improvements of particular importance which have not been implemented or studied are noted in this reports' recommendations.

#### TRANSIT SERVICE

An effective transit system can provide a realistic alternative to the automobile. This is important in the I-5 corridor. If commuters can be encouraged to switch from their autos to transit, some decrease in the amount of traffic congestion can be expected. In addition, this more efficient means of travel reduces energy consumption and air pollution while increasing highway safety.

It is generally recognized that publicly owned transit systems can provide a higher service level than can private systems. Public systems can reduce fares and operate high service levels because the public system can use tax subsidies to make up operating deficits. The private system cannot obtain subsidies and is dependent on farebox revenues.

In order to improve transit service in this corridor, it is necessary to purchase the private transit service currently operating in the corridor and form a public transit system in Clark County. A Clark County system will support the service operating in the corridor by providing a transit feeder system to the corridor service.

Public transit districts, encompassing an entire metropolitan area, have been a reality in Oregon since 1969. The Tri-County Metropolitan District (Tri-Met) in the Portland area was formed under legislation which permits the creation of special purpose districts to provide transit service. However, Washington law has been amended only recently to permit jurisdictions, other than cities to fund and provide transit service.

The 1975 Washington Legislature amended Washington Law to modify the manner in which public transit is funded and administered. Under the revised legislation, transit districts larger than an individual city but smaller than a county are permitted. These districts are to be formed by action of a public transit improvement conference, which is an official body composed of representatives from a given county and the cities therein.

Transit service can now be financed by a household utility tax, a business and occupation tax or a retail sales tax at the rate of .1, .2, or .3 of one percent. The household utility tax and business and occupation tax can be used in combination with each other, the sales tax must be used alone. Imposition of any of these taxes requires a vote of the people. Receipts from the business tax and the utility tax may be matched by receipts from the state's motor vehicle excise tax.

The approval of this legislation provides Clark County with a variety of means of organizing financing and implementing transit service. The Task Force makes no specific recommendations on how

the service should be organized or funded. However, a transit system which would provide reasonable degrees of relief in the corridor needs a feeder system which is carefully coordinated with the operation of corridor service and which can serve populous areas with the urban service boundary. Development of a new system should carefully consider these factors.

The laws of both Oregon and Washington permit public transit agencies to contract with other transit agencies, public or private, to provide service. Therefore, it is possible for a Washington agency to contract with an Oregon system, such as Tri-Met, to provide all or part of its service. If a service contract is developed, it would be necessary for Washington agencies to subsidize any operating losses incurred by Tri-Met. Possible service arrangements are noted in the technical summary (see figure III-5).

A contractual service arrangement with Tri-Met has particular applicability in the I-5 Corridor between Vancouver and Portland. Service would be operated in an area not totally within the boundaries of any single transit district, city, or county or benefit area. This arrangement would permit an even distribution of the service costs on the basis of benefits received.

To assist in the implementation of a transit system in Clark County, the I-5 project has developed a transit planning information base for Clark County. The project staff's work has centered in four areas including service criteria, identifying types of service which may be operated in Clark County, estimating system operation and capital costs, and noting sources of and estimated revenue. Specific bus routings or identification of a service area have been avoided as these considerations are policy decisions which will be made at the County's Public Transportation Improvement Conference and the resulting planning efforts.

Planning efforts have identified six types of transit service which can be operated in Clark County. These included Arterial Service, Local Service, Intercity Service, Corridor Service, Shuttles and Special Transportation.

Arterial service is designed to operate on arterial highways. This service provides fast service at reasonably frequent intervals from residential communities and neighborhoods to the Vancouver central business district. Extra buses are provided during the peak periods to handle the demand created by commuters traveling to and from work.

Local service offers transportation to people dependant on the transit system for their travel needs. Local service emphasizes coverage and provides transportation to a variety of destinations. Dial-a-bus systems or other forms of "demand responsive transit" may be used to provide "door to door" service.

Intercity service provides transportation between the similar cities of Clark County and the Vancouver CBD. Service is scheduled according to need and may be operated on an hourly, daily or even a weekly basis.

Corridor service offers transportation between the downtown areas of Vancouver and Portland. The purpose of corridor service is to provide a fast, inexpensive alternative to automobile travel in the Interstate Bridge Corridor, encouraging commuters to use transit. Corridor service should utilize exclusive lanes described in the latter part of this report.

Shuttles are designed to transport workers to concentrated employment centers where there is a common starting and ending time. Factory shift changes, for example, can be effectively served by shuttles.

Special Transportation serves people unable, due to physical handicaps, to drive automobiles or board conventional transit buses. Provision of special transportation services is required by federal regulations and encouraged by CRAG policies.

The system will incur a number of capital expenditures in order to provide a high level of service. New buses must be purchased, a maintenance facility must be constructed and system amenities such as transit stations and bus shelters should be provided.

Operating expenses include those expenditures necessary to operate, service and administer the transit system. Current operating expenses of existing systems indicate that an operating cost of between \$14 and \$18 per bus hour\* should be expected.

The service categories have been combined in two scenarios to illustrate examples of the type of service which could be provided for a given level of funding. Scenario One illustrates the moderate level of service within the Vancouver urban area with connections to Camas and Washougal. Operating expenses are anticipated to run approximatley \$1.1 million per year and capital expenditures are estimated at \$2.2 million\*. Scenario Two portrays a countywide transit system for about \$2.2 million in operating expenses and a \$6.6 million\* outlay. These scenarios are not recommendations but were developed as illustrations of the kind of service that is available for a particular cost. There are any number of detailed service possibilities between these two alternatives.

<sup>\*</sup> The cost of operating one bus for one hour

<sup>\*</sup> This represents the total capital costs. Federal funding can be expected to pay 80% of the capital cost. Therefore, the local share is estimated at \$440,000 for Scenario One and \$1.3 million for Scenario Two.

## PRIORITY TREATMENT

To encourage commuters to make more efficient use of vehicles traveling the I-5 corridor and, therefore, increase the "passenger capacity" of the freeway, it has been recommended that incentives be provided to persons using transit and carpools. These incentives are designed so that persons using buses and carpools can bypass traffic congestion and arrive at their destinations more quickly than if they had traveled alone. The task force studied two kinds of priority treatment including an exclusive lane for HOV's (High Occupancy Vehicles -Buses and Carpools) and ramp control. The exclusive lane is a freeway lane on which use is restricted to HOV's. Ramp control is a method by which entrance to the freeway is restricted during those times when the freeway becomes congested. HOV's are permitted to bypass the control device without restriction. By encouraging the more efficient use of vehicles, ramp control and exclusive lanes will help reduce the overall level of traffic congestion on the affected highway. The technical analysis indicated that an express lane would double the number of carpools and transit ridership using the I-5 freeway. Increasing the number of carpools and transit usage, in turn, reduces the number of autos traveling on the freeway, thus reducing congestion.

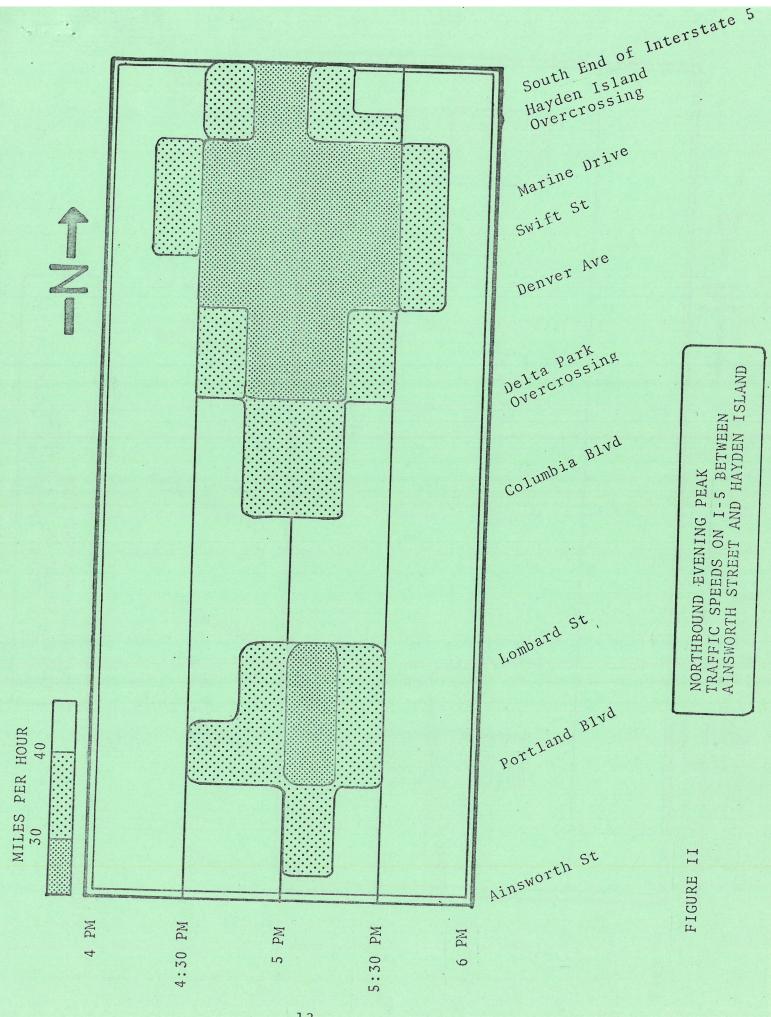
An exclusive lane on the I-5 freeway could be provided with only minor reconstruction by using narrower lanes and a portion of the existing shoulder. The present highway shoulders could be reduced and the existing lanes narrowed slightly (to about 11') to provide another lane. The additional lane would be reserved for buses and carpools.

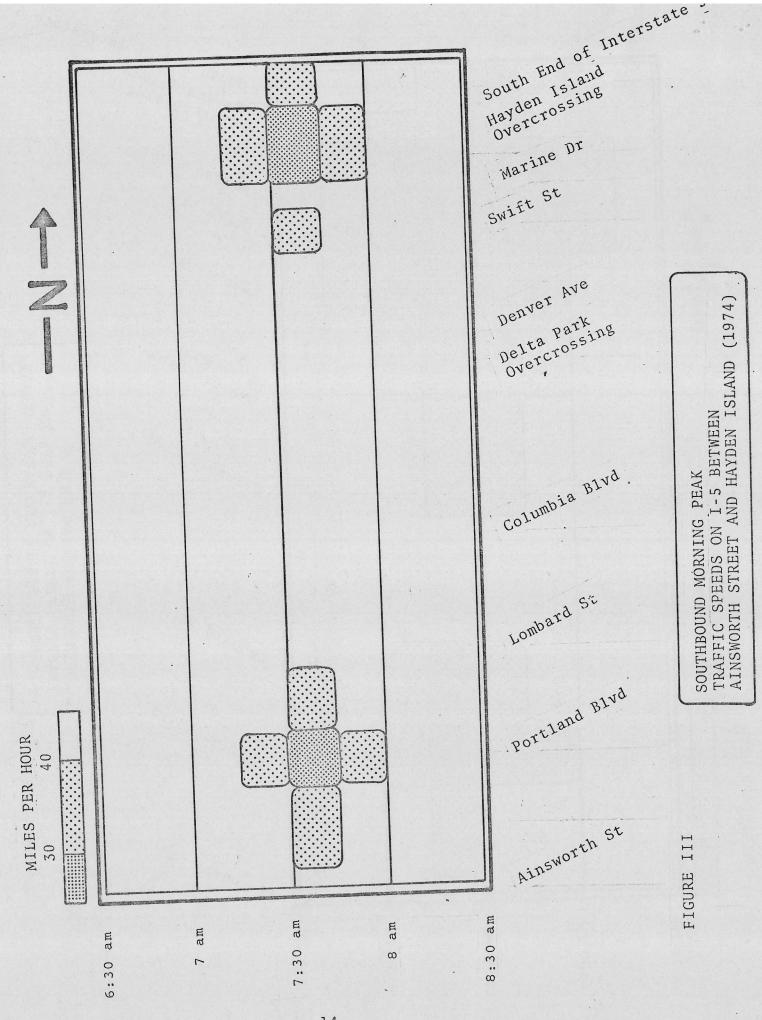
The cost and benefits of a closed circuit monitoring system should be studied. Such a system could be useful, not only in detecting violators, but also in helping to spot traffic accidents and other conditions which disrupt freeway operations.

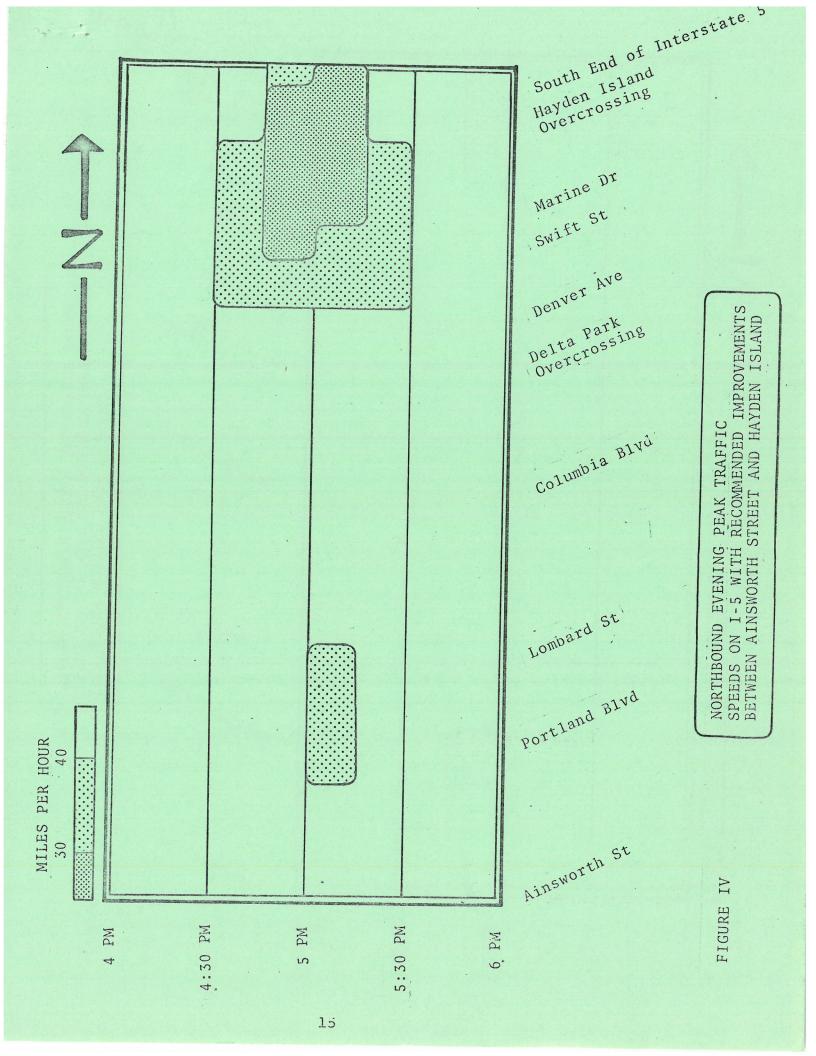
An analysis was conducted which showed that congestion was significantly reduced with the implementation of an exclusive lane, ramp control and other improvements. In addition, improvements were realized in air pollution, energy conservation and safety. The greatest improvement occurred in the evening peak period.

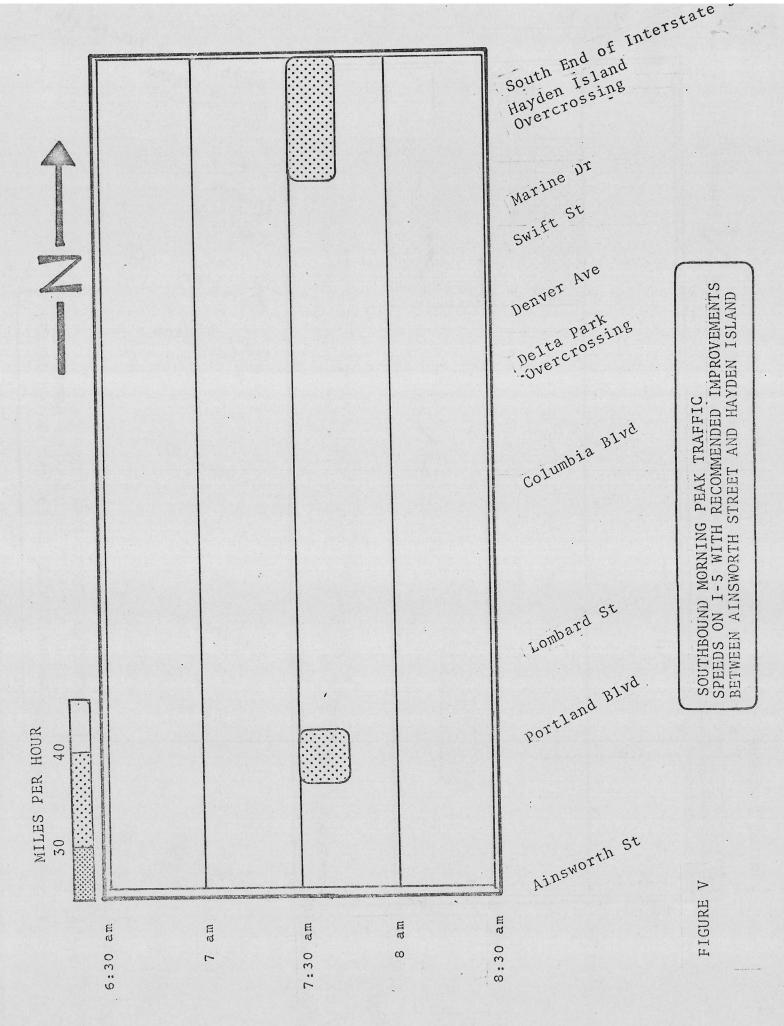
The improvements recommended herein will significantly augment the operations of the traffic flow. This is illustrated by comparing the existing conditions northbound (figure 2) and southbound (figure 3) with the expected operational conditions shown on figures 4 and 5. The detailed study material is contained in the Technical Analysis.

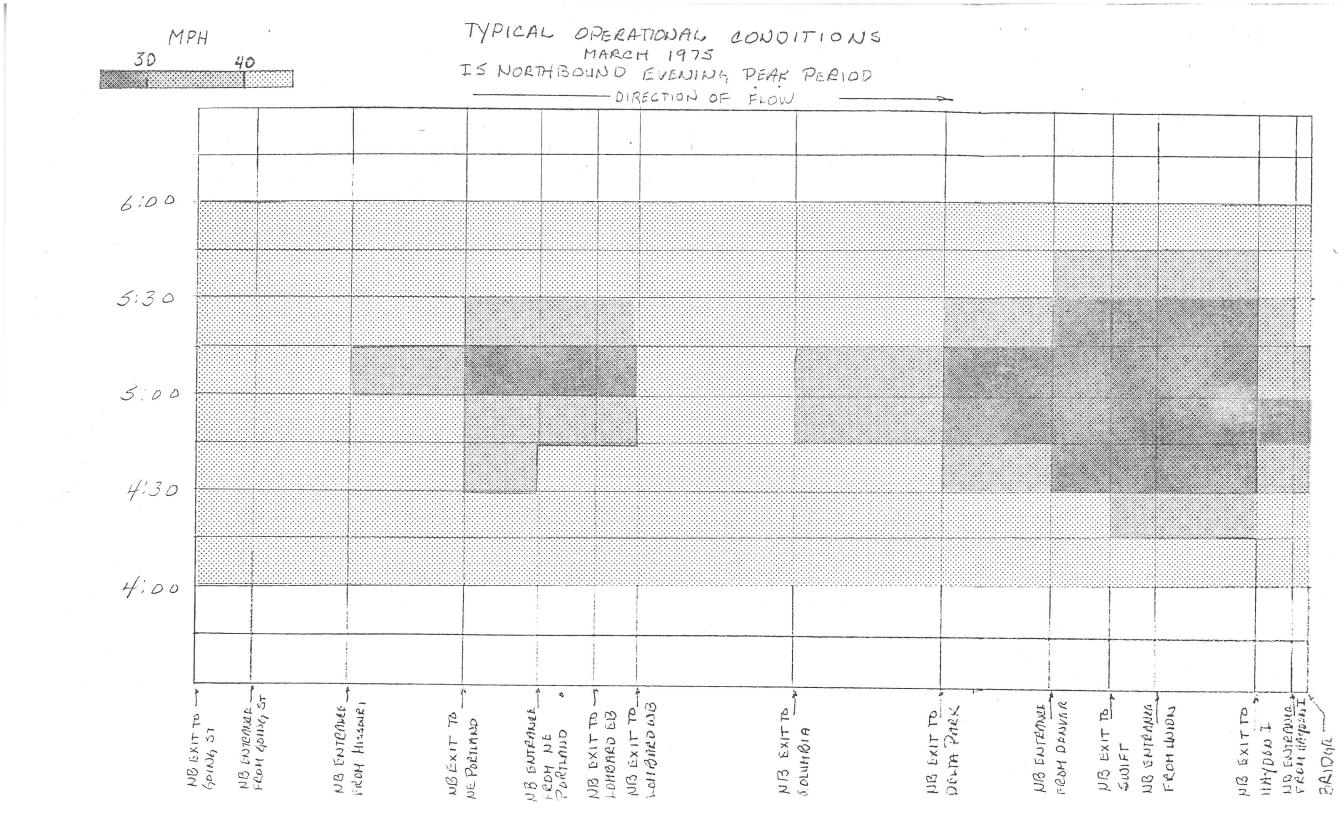
While provision of immediate relief is the major focus of the . Interstate Bridge Corridor Project, long range considerations have also been studied. The completion of I-205 shortly after 1980, is expected to provide a degree of relief in the interstate bridge corridor. However, continued development in the Rivergate industrial area as well as in Clark County, will cause high traffic volumes on the I-5 freeway. By 1990 the traffic volumes in I-5 are expected to equal or exceed present day counts. In order to avoid traffic conditions even more congested than those currently experienced on the freeway, high occupancy vehicles (HOVs) will have to play a major role in increasing the people moving capacity of the interstate bridge corridor. Estimates prepared by the Governors Task Force on Transportation show that bus lanes operating on the freeway and on Union Avenue could carry approximatley 30,000 daily riders. Transit operating on the freeway could maintain one minute headways during the peak periods, five minute headways during the daytime off peak and 30 minutes for evening and night service. Provision of bus lanes within the existing right-of-way would enable the planning staffs of ODOT, Tri-Met and WSHD to study the impacts of the low capital intensive HOV priority system prior to the development of a more permanent busway. In addition, the bus lanes would provide a means of gradually upgrading transit service in the corridor. Thus, ridership could be increased to a point where the development of the capital intensive busway would be justified.











TYPICAL OPERATIONAL CONDITIONS MARCH 1975 MPH IS SOUTH BOUND MORNING PEAK PERIOD DIRECTION OF FLOW 8:30 8:00 7:30 7:00 6:30 FECH GOING ST SECH GOING ST SECH HINDESOIA 5 B ENTERNAL -FOON PELTA PARK SIB ENTRANCE -S B EXIT TO UNION-SBEXIT TO WE PORTING FROM LONGARD 58 SANTENCE FROM HAYBENT 5 B EXIT TO HAYDEN I SB ENTEANDE. SB EUTERNEE. FEEM DE COLUMBIN SB EXIT TO DENVER AVE SB ENTERNEE FROM NE POETHNO SBEXIT TO MINNESOIA SBEXIT TO -

## HOV LANE ANALYSIS

I-5

Portland Blvd. to Vancouver

Objective: To evaluate the impact of a HOV on the lone volumes

| Results:              | Lane    | W/O HOV Lane     | W/ HOV Lane          |  |
|-----------------------|---------|------------------|----------------------|--|
| Portland Blvd         |         |                  |                      |  |
| AM                    | 3 (HOV) |                  | 319uph 1310pph       |  |
|                       | 2       | 2000uph 2990pph  | 1860uph 2600pph      |  |
|                       | 1 (42%) | 1500uph 2220pph  | 1325uph 1860pph      |  |
| PM                    |         |                  |                      |  |
|                       | 3 (HOV) |                  | 190uph 855pph        |  |
|                       | 2       | 1940uph 2760pph  | 1860uph 2580pph      |  |
|                       | 1 (42%) | 1410uph 2000pph  | 1300uph 1810pph      |  |
| Columbia Slough<br>AM |         |                  |                      |  |
| Tun                   | 4 (HOV) |                  | 450uph 1830pph       |  |
|                       | 3 (40%) | 1920uph 2860pph  | (39%)1700uph 2380pph |  |
|                       | 2 (37%) | 1780uph 2650pph  | (39%)1700uph 2380pph |  |
|                       | 1 (23%) | 1110uph 650pph   | (22%) 960uph 1340pph |  |
| PM                    |         |                  |                      |  |
|                       | 4 (HOV) | · 11             | 260uph 1200pph       |  |
|                       | 3       | 1880uph 2670 pph | 1730uph 2400pph      |  |
|                       | 2       | 1790uph 2540 pph | 1730uph 2400pph      |  |
|                       | 1       | 1030uph 1440 prh | 980uph 1360pph       |  |

## NOTE:

UPH - Vehicles per hour

PPH - Passengers per hour



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 MEMORANDUM

SEPTEMBER 8, 1975

TO:

DICK ETHERINGTON, CRAG

FROM:

BILL DIRKER, TRANSPORTATION COORDINATOR

SUBJECT: I-5 CORRIDOR REPORT

Following are random comments of greater and lesser substance on the draft final report on the Interstate Bridge Corridor project.

## Executive Summary

- 1. Page 1 Stress that this project was to address the time period before I-205 becomes operational.
- 2. Page 2 The phrase "could have been implemented quickly" seems unduly editorial.
- 3. Page 3 Second paragraph seems more straight forward if we used some phrase such as "the public system can tax subsidies that the private system cannot".
- 4. Page 4 This page seems to contain excessive detail on the formation of a transit district. Think this would be better in the technical report and simply make a reference to it in the summary.
- 5. Page 5 It's not clear to me that if Tri Met contracts to provide some or all of the service in Washington, it can qualify for Washington State tax support. Clearer statement of the options and combinations available could be made. Possibly one way to handle it is to list all of the options and combinations of service arrangements in the technical report. This summary then might refer to these saying there are "X" options available and that we recommend the following
- 6. The basic recommendations appears to be that Tri Met could take over the interstate corridor service and that the local transit district could provide service in and around Vancouver. These two systems would interface at the proposed Vancouver transit station. I think some discussion of the status of this Vancouver transit station project would strengthen this report noting that this is a funded and operational project.

Ch.

## Technical Analysis

- Page 2 last paragraph. The Interstate Bridges are lift span bridges, not draw bridges.
- 2. Page 3 This discussion of the role of transit service is excellent. This could well be used in the Executive Summary.
- 3. Page 4 last paragraph. It was my recollection that following Phase ONe the focus was to be implementing the recommendations of Phase One.
- 4. Page 36 Table III-C can this table be expanded to include not only rider-ship and revenues but also cost and subsidy required for each level of service? Also, in footnote, where is Appendix E?
- 5. Page 62 Appendix A seems rather strange. An auto carrying less than two persons is automatically carrying one person unless there has been a terrible tragedy.
- 6. Page 41-42, IV-1,2 "Minnesota and Missouri" shouldn't these actually be called "Portland"? This refers to the Portland Blvd. interchange.
- 7. Page 44 discussion of ramp control is good, and I think our recommendation probably should be that it should be included in a careful preliminary engineering study.
- 8. Fig. V, Sheets 1, 2, 3 following page 60, the note on these maps should be deleted.
- 9. Why is this study not carried south of Ainsworth Street to some logical junction with I-405 at Fremont Bridge, or to Banfield? As indicated in Appendix C there will undoubtedly have to be transitions and priority treatment could well be carried to some major junction point.
- 10. Stress should be laid on the fact that actual operating experience will be gained shortly from the Banfield HOV demonstration project and also from the Barbur Blvd. bus lanes. This report will be part of the basis for seeking federal aid on I-5 and reinforcement gained from experience on these other projects, also federally aided, should be helpful justifying the I-5 project.
- 11. There should be a list of Tables and Maps.
- 12. The carpool project operated by Tri Met has issued a poster entitled "Free the Interstate 5" showing a photograph of heavy conjection on I-5 in the vicinity of Skidmore Street. This is an excellent photo illustrating the problem we are trying to deal with, and would be a desirable addition to this report.



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> PLANNING 503 248-4253

> ZONING 503 248-4250

August 28, 1975

Richard Etherington, Transportation Director CRAG 527 SW Hall Portland, OR 97201

Dear Mr. Etherington:

Upon review of the Draft Final Report of the Interstate Bridge Corridor Project I find it deficient in certain particulars.

The Phase I recommendations should be included in the Technical and Summary Report.

The principal deficiency is its failure to justify and recommend southbound priority vehicle (HOV) lanes. The essential data analysis for this feature is found on p.39, Table IV-1. I believe the technical analysis is in error as shown below.

The key data is in the a.m. peak hour southbound vehicles per hour (VPH) and persons per hour (PPH) with HOV lane at Columbia Slough and at Portland Blvd.

The three non-HOV lanes show 4540 vehicles and 5260 passengers (1.16 P/V) at Columbia Slough. At the same point there are 270 vehicles and 1360 passengers (5.0 P/V) in the HOV lane.

At Portland Blvd., 2.77 miles to south containing four exits and five entrances, the non-HOV lanes contain 3410 vehicles and 4190 persons (1.23 P/V). This is 75% of the vehicles and 80% of the persons at Columbia Slough.

The HOV lane at Portland Blvd. is shown to contain 90 vehicles and 730 persons (8.1 P/V). This is 33% of the vehicles and 54% of the persons in the HOV lane at Columbia Slough.

This data suggests that high occupancy vehicles leave I-5 at almost three times the rate as other vehicles. This does not make sense. Some of the HOV's are buses and I'm not aware of any southbound routes that would leave I-5 north of Portland Blvd. There is a propensity for carpool trips to be longer than shorter (see graph attached).

## Page 2

It is not reasonable that a very high proportion of carpools would leave I-5 north of Portland Blvd. when the major work centers are to the south. If only the same proportion of HOV's reached Portland Blvd. as non-HOV's, the HOV lane would contain 212 vehicles and 1090 persons. This should improve the level of service for the non-HOV lanes. With this analysis it appears that an HOV lane in both directions is justified and this should be our recommendation.

A principal recommendation of this report should be that the Oregon Department of Transportation undertake a preliminary engineering study of priority lanes, including consideration of associated traffic operations measures, ramp metering, and surveillance. This study shows that these measures to increase capacity justify more serious and detailed consideration.

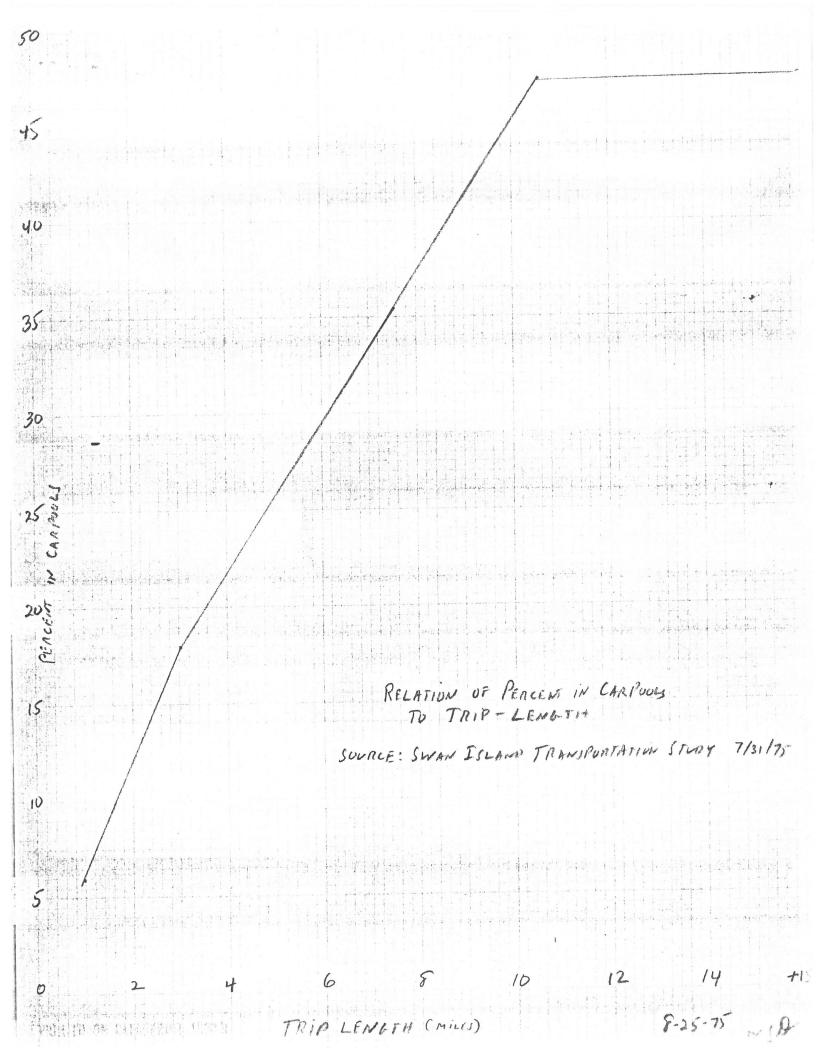
More detailed comments are in the attached memo.

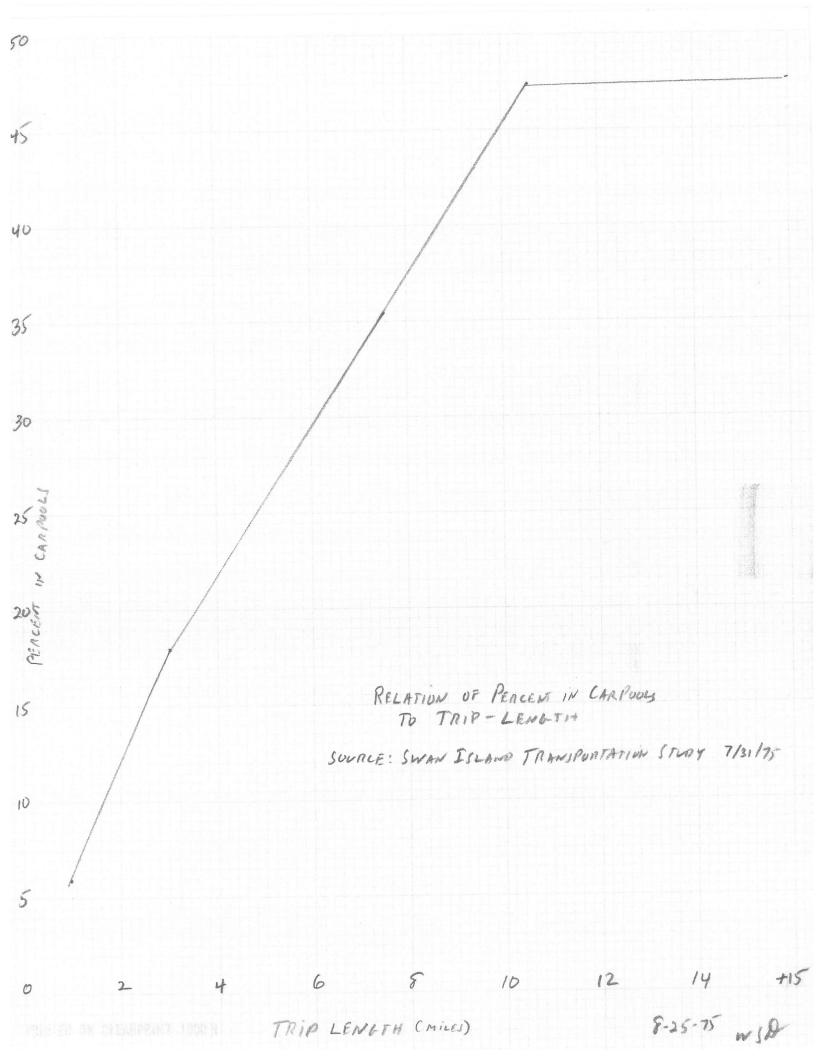
Very truly yours,

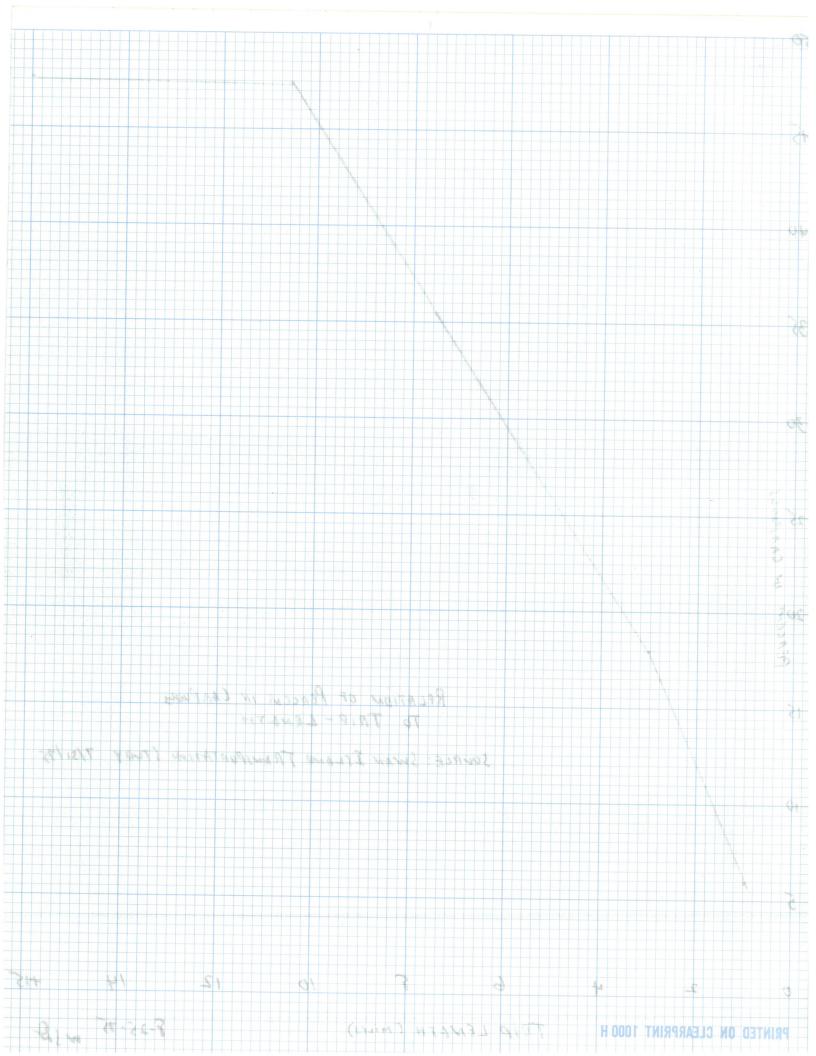
William Dirker Transportation Coordinator

ag

Attachment:







# I-5 Report

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THE USE OF CARPOULS INCREADED AS TRIPLENUTA INCREASES - SEE GRADA
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## COLUMBIA REGION ASSOCIATION OF GOVERNMENTS



Memorandum

August 22, 1975

To:

Project Task Force

City of Portland Bureau of Planning

From:

Pat Blackwell, Chairperson Citizen's Advisory Committee the

Interstate Bridge Corridor Project CAC Critique of Draft Final Report

Subject:

cac critique of brait rinar Report

The Interstate Bridge Project Citizen's Advisory Committee (CAC) met on August 19th to discuss the draft of the Project's final report - Technical Analysis and Executive Summary.

The CAC critiqued the Executive Summary and technical analysis separately. Comments on the Executive Summary were made as follows:

- 1) Improvements need to be made in the graphic presentation on pages 12 and 13. The citizens felt that these charts were useful but difficult to understand in their present format.
- 2) The recommendations should be placed at the beginning of the text to increase the impact on persons wishing to merely scan the report.
- 3) A short summary of the Phase I recommendations is needed in the text.
- 4) The vicinity map should be enlarged to include the portion of the Washington side that is considered part of the corridor.
- 5) The front cover should be improved to more clearly emphasize the traffic congestion problem illustrated by the cover photo.
- 6) All improvements made in the Executive Summary should also be reflected in the Technical Analysis where appropriate.
- 7) The title of the report should be changed from Executive Summary to Synopsis.

The following comments were made on the Technical Analysis:

- 1) The term SMSA (page 2) needs further clarification.
- 2) The section on "system effect concept" is useful but can be shortened and the illustration can be deleted.
- 3) The report title should be changed from Technical Analysis to Technical Report.
- 4) A "time frame" for implementation of the recommendations is needed.

- 5) An estimate of the revenues anticipated from the Business and Occupation tax should be included in figure III-B.
- 6) Clarification should be made regarding the procedures by which territory is annexed or withdrawn from a Public Transit Benefit Area.
- 7) Recognition is needed on the impact of I-205 on highway and transit improvements in Clark County.
- 8) Wording changes are needed to imply stronger actions on recommendations 1 and 3.
- 9) Table III-A should be further clarified regarding expenditures for management functions by the Vancouver Transit System.
- 10) The low, medium and high levels of service noted on page 30 need further explanation.
- 11) The report should include a bibliography.

Most comments regarding the summary were directed toward the report's format. The report content was considered to be readable, pertinent and highly informative.

The comments are provided to PTF so that they may be considered for incorproation into the final draft of the report.

## COLUMBIA REGION ASSOCIATION OF GOVERNMENTS

Memorandum

August 12, 1975

To:

IBC Project Task Force & Citizens Committee

From:

Project Staff

Subject:

Executive Summary and Technical Analysis, Interstateortland

Bridge Corridor Project - Final Report

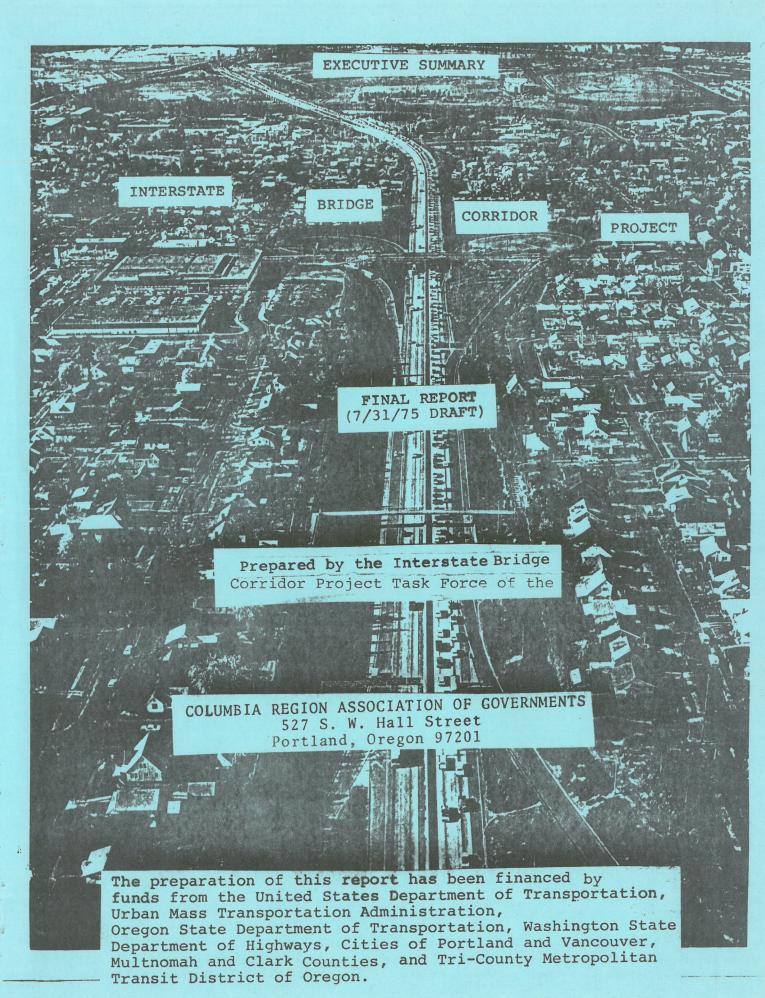
ureau of Planning

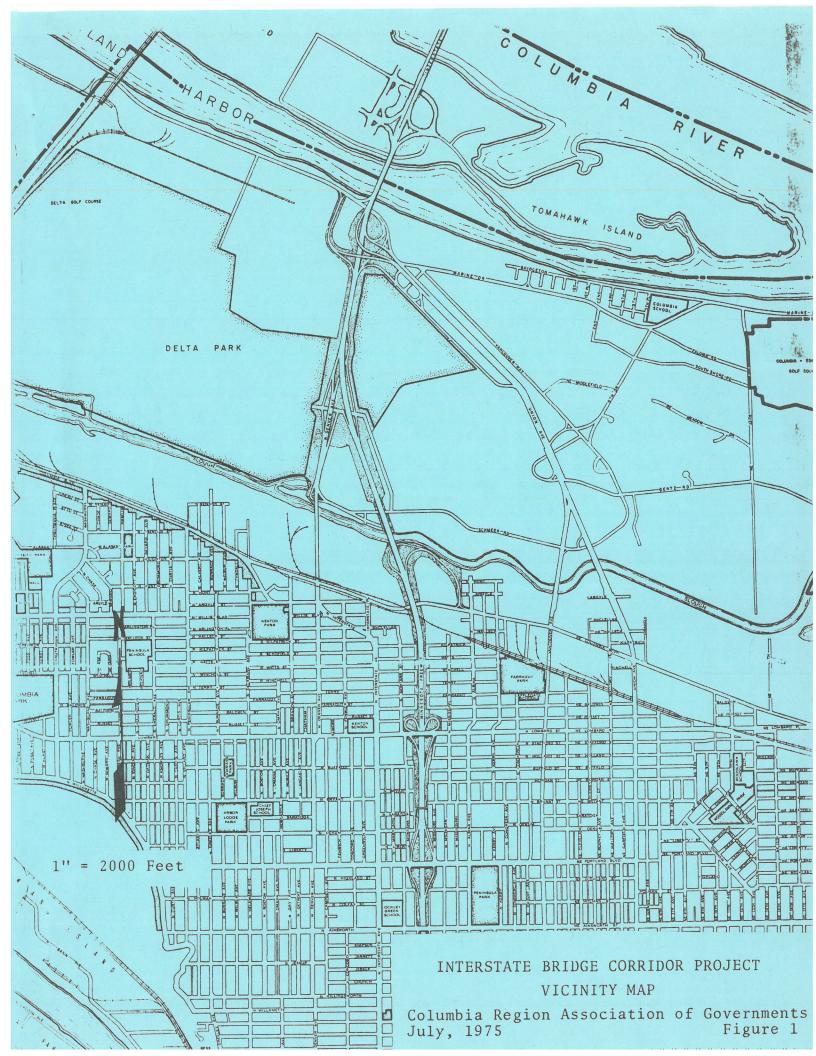
Transmitted herewith are copies of drafts of the Executive Summary and Technical Analysis of the Interstate Bridge Corridor Project Final Report.

This report is based, in part, on findings developed in the project's Phase I Report. The Phase I Report identified the sources of traffic congestion in this corridor and recommended a number of low capital intensive improvements to alleviate this congestion.

The final report suggests a number of medium range improvements which can be implemented in the corridor to more permanently improve the passenger capacity of the corridor. In addition, recommendations are made regarding the establishment of a transit system within Clark County.

Your review and comment on this draft report is appreciated. Please forward your comments to the project staff at CRAG before the end of August.





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Susan Regan Vern Rifer Betsy Strong Richard Swennes BeniWitt

## REPORT PREPARED BY THE FOLLOWING COLUMBIA REGION ASSOCIATION OF GOVERNMENTS STAFF

Larry Rice Richard Etherington Reed Gibby William Pettis John Krawczyk

Executive Director Transportation Director Transportation Planner Transportation Planner Transportation Planner

## INTRODUCTION

This executive summary has been prepared to convey essential information obtained by the Interstate Bridge Corridor Project as well as the project's recommendations. Detailed information regarding findings and background material is contained in the Technical Analysis of the final report.

It is anticipated that decision makers and other interested parties will find this summary useful in obtaining a general understanding about the critical transportation problems in the corridor as well as the means which may be undertaken to address these problems.

The Interstate Bridge Corridor project was formed in late 1973 to address the problems of severe traffic congestion that had become a frequent occurance on the I-5 Freeway between Vancouver and Portland. A special interagency project was formed to analyze the conditions and present recommendations for improvement, since the corridor affects a number of jurisdictions including 2 states, 2 cities and 2 counties. In addition, 4 transit operators provide service within or near this transportation corridor.

Traffic congestion in the Interstate Bridge corridor has become a critical problem for several reasons. First, I-5 is the major north-south Interstate Highway on the Pacific Coast. Substantial volumes of interregional traffic are carried by this highway. Second, this freeway is an important commuter route within the Portland-Vancouver Metropolitan area. Each day, thousands of commuters use I-5 to reach their places of work. Finally, I-5 is important because it represents the only highway crossing of the Columbia River in the Portland Metropolitan area. Persons traveling between Clark County Washington and

the remainder of the metropolitan area have no choice except to use the I-5 corridor for travel between the two states. Traffic congestion in the corridor disrupts commercial, social and recreational travel in the urban area, as well as the north or southbound interregional travel.

Traffic conditions in the corridor were examined during phase I of the project. The Phase I Report identified a number of low-cost, short term improvements which could have been implemented quickly to provide a degree of immediate relief in the corridor. This final report deals generally with more capital intensive improvements which more permanently aleviates the congested traffic conditions in the corridor. In particular, these improvements include upgrading of the transit service in the corridor and implementation of a system of priority treatment for high occupancy vehicles (buses and carpools) on Interstate 5.

#### TRANSIT FUNDING

An effective transit system can provide a realistic alternative to the automobile. This is important in the I-5 corridor. If commuters can be encouraged to switch from their autos to transit, some decrease in the amount of traffic congestion may be expected. In addition, this more efficient means of travel reduces energy consumption and air pollution while increasing highway safety.

It is generally recognized that publicly owned transit systems can provide a higher level of service than can private systems. Public systems can reduce fares and operate high levels of service because capital and operating cost are not totally dependent on fare revenues. In order to improve transit service in the corridor, it is necessary for the fare transit service in the corridor and form a public transit system in Clark County. A Clark County system will support the service operating in the corridor by providing a transit feeder system to the corridor service.

Public transit districts, encompassing an entire metropolitan area, have been a reality in Oregon since 1969. The Tri-Met transit district in the Portland area was formed under legislation which permits the creation of special purpose districts to provide transit service. However, Washington law has been amended only recently to permit jurisdictions, other than cities to fund and provide transit service.

The 1975 Washington Legislature amended Washington Law to modify the manner in which public transit is funded and administered. Under the revised legislation, transit districts larger than an individual city but smaller than a county are permitted. In addition transit who to detail is Termin plyers

service can be financed by a household utility tax, a business and occupation tax or a retail sales tax at the rate of .1, .2, or .3 of one percent. The household utility tax and business and occupation tax can be used in combination with each other. The sales tax must be used alone. Imposition of any of these taxes requires a vote of the people. Receipts from the business tax and the utility tax may be matched by receipts from the state's motor vehicle excise tax. The match is expected to provide up to 1/3 of the total revenue for local transit service.

The new legislation permits the formation of Public Transit

Benefit Areas (PTBA) larger than a city. Tax support for such a
city is levied where the transit service is provided. A PTBA is formed
by the action of a special public transportation improvement conference.
The conference may be conviened by the county commissioners, the
legislative bodies of two or more cities or by a petition signed
by at lease 10% of the voters in the county or counties in which
the conference is to be held. The county commissioners and each
of the cities in the county are to be represented at the conference.
The purpose of the conference is to define the boundaries of the
PTBA. Cities, however, may withdraw from the Benefit Area and the
boundaries may be redrawn by the county commissioners. Sixty days
after completion of the conference, the PTBA is considered formed.
At this time, participating cities and counties are required to
select representatives to the PTBA governing body.

Prior to the inauguration of service, the PTBA must prepare a transit plan. The plan is to be submitted to the Department of Community Development of the State of Washington. This agency will certify the PTBA's plan and determine its eligibility for state matching funds.

1

The laws of both Oregon and Washington permit public transit
agencies to contract with other transit agencies, public or private,
to provide service. Therefore, it is possible for a Washington
agency to contract with an Oregon system, such as Tri-Met, to [am Thi gumbh
provide all or part of its service. Such an arrangement would for WMWN | Frit
be particularly important in providing service in the I-5

Corridor. Here, service would be operated in an area that is not
totally within the boundaries of any single transit district or
benefit area.

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#### TRANSIT SERVICE

To assist in the implementation of a transit system in Clark County, the I-5 project has developed a transit planning information base for Clark County. The project staff's work has centered in four areas including service criteria, identifiying types of service which may be operated in Clark County, estimating system operation and capital costs, and noting sources of and estimated revenue. Specific bus routings or identification of a service area have been avoided as these considerations are policy decisions which will be made in the County's Public Transportation Improvement Conference and the resulting planning efforts.

Planning efforts have identified six types of transit service which can be operated in Clark County. These included Arterial Service, Local Service, Intercity Service, Corridor Service, Shuttles and Special Transportation.

Arterial service is designed to operate on arterial highways.

This service provides fast service, at reasonably frequent intervals from residential communities and neighborhoods to the Vancouver central business district. Extra buses are provided during the peak periods to handle the demand created by commuters traveling to and from work.

Local service offers transportation to persons dependant on the transit system for their travel needs. Local service emphasizes coverage and provides transportation to a variety of destinations. Dial-a-bus systems or other forms of "demand responsive transit" may be used to provide "door to door" service.

Intercity service provides transportation between the smaller cities of Clark County and the Vancouver CBD. Service is scheduled according to need and may be operated on an hourly, daily or even

a weekly basis.

Corridor service offers transportation between the downtown areas of Vancouver and Portland. The purpose of corridor service is to provide a fast, inexpensive alternative to automobile travel in the Interstate Bridge Corridor, encouraging commuters to use transit. Corridor service should utilize exclusive lanes described in the latter part of this report.

Shuttles are desinged to transport workers to concentrated employment centers where there is a common starting and ending time. Factory shift changes, for example, can be effectively served by shuttles.

Special Transportation serves persons unable, due to physical handicaps, to drive automobiles or board conventional transit buses. Provision of special transportation services is strongly encouraged by federal regulations and by CRAG Policies.

The system will incur a number of capital expenditures in order to provide a high level of service. New buses must be purchased, a maintenance facility must be constructed and system amenities such as transit stations and bus shelters should be provided.

Operating expenses include those expenditures necessary to operate, service and administer the transit system. Current operating expenses of existing systems indicate that an operating cost of between \$14 and \$18 per bus hour\* should be expected.

<sup>\*</sup> The cost of operating one bus for one hour

#### PRIORITY TREATMENT

To encourage commuters to make more efficient use of vehicles traveling the I-5 Corridor and, therefore, increase the "passenger capacity" of the freeway, it has been recommended that incentives be provided to persons using transit and carpools. These incentives are designed so that persons using buses and carpools can bypass traffic congestion and arrive at their destinations more quickly than if they had traveled alone. The project studies two kinds of priority treatment including an exclusive lane for HOV's (High Occupancy Vehiclesbuses and carpools) and ramp control. The exclusive lane is a freeway lane on which use is restricted to use by HOV's. Ramp control is a method by which entrance to the freeway is restricted during those times when the freeway becomes congested. HOV are permitted to bypass the control device without restriction. By encouraging the more efficient use of vehicles, ramp control and exclusive lanes will help reduce the overall level of traffic congestion on the effected highway. The technical analysis indicated that an express lane would double the number of carpools and transit ridership using the I-5 freeway. Increasing the number of carpools and transit usage, in turn, reduces the number of autos traveling on the freeway and thus reduces congestion.

An exclusive lane on the I-5 freeway could be provided with only minor reconstruction by using the existing shoulder. The present highway shoulders could be reduced and the existing lanes narrowed slightly (to about 11½') to provide another lane. The additional lane would be reserved for buses and carpools. Turnouts would be provided at frequent intervals to allow for emergency stops. The problem of law enforcement can be greatly alleviated with the installation and operation of a closed circuit television serveillance system. An analysis was

OPT WAS

conducted and showed that congestion was significantly reduced with the implementation of an exclusive lane, ramp control and other improvements. In addition, improvements were realized in air pollution, energy conservation and safety. The greatest improvement occurred in the evening peak period.

The improvements recommended herein will significantly augment the operations of the traffic flow. This is illustrated by comparing the existing conditions northbound (figure 2) and southbound (figure 3) with the expected operational conditions shown on figures 4 and 5. The detailed study material is contained in the Technical Analysis.

BETWEEN AINSWORTH STREET AND HAYDEN ISLAND

TYPICAL EXISTING CONDITIONS (1974)

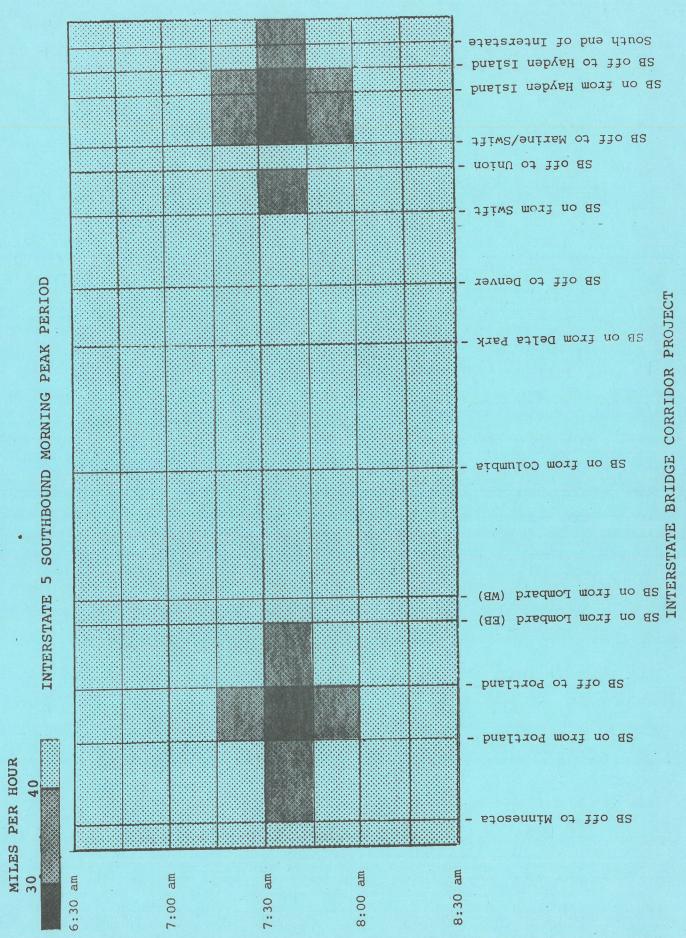


Figure 3

12

TYPICAL CONDITIONS EXPECTED WITH RECOMMENDED IMPROVEMENTS

BETWEEN AINSWORTH STREET AND HAYDEN ISLAND

TYPICAL CONDITIONS EXPECTED WITH RECOMMENDED IMPROVEMENTS

#### RECOMMENDATIONS

To reduce traffic congestion in the Interstate Bridge Corridor, to provide publicly owned and operated transit service in the corridor and in Clark County, to conserve fuel, improve safety and improve air quality in the region, are several recommendations proposed for the implementing agencies to consider. They appear on figure 6. Some recommendations that were contained in the Phase I Report have been included because little or not action has been taken on them.

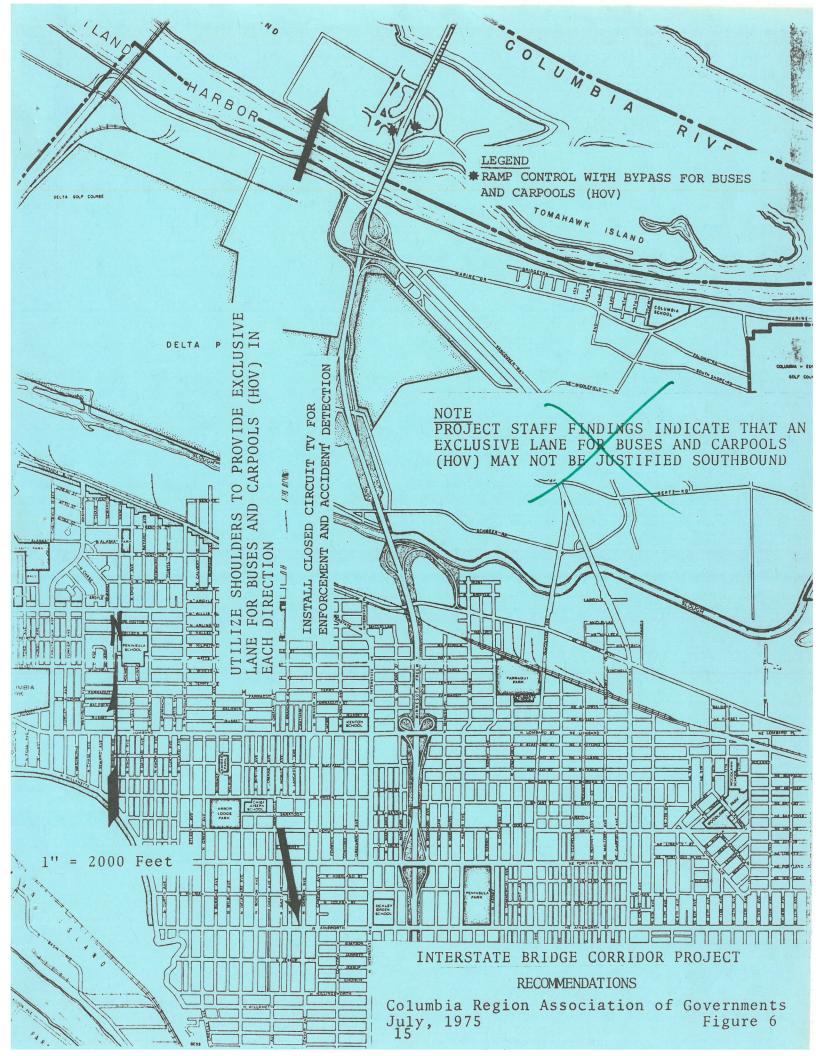
- 1. Clark County elected officials immediately call a Public Transportation Improvement Conference.
- 2. Clark County and/or Vancouver elected officials immediately request Tri-Met to purchase the privately owned Vancouver-Portland Bus Company service operating in the Interstate 5 Corridor.
- 3. Oregon State Department of Transportation install priority treatment measures as follows:
  - Add a lane in both directions between Ainsworth Street and Hayden Island for buses and carpools (HOV).
  - b. Ramp control at Hayden Island on-ramps with bypasses for HOV.
  - c. In cooperation with the Oregon State Police install and operate a closed circut television surveillance system.

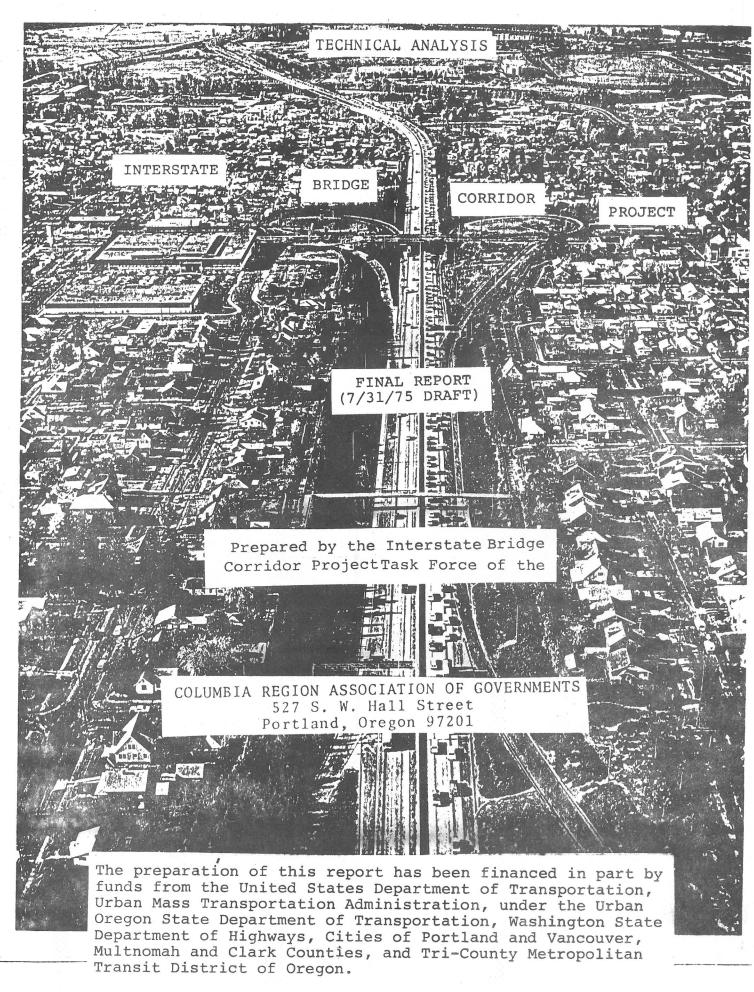
NOTE: The findings the Project Staff indicated that an HOV lane in the southbound direction is probably not justified and recommends that the shoulder under the Portland Blvd structure be used as a southbound lane or install a ramp control device at Lombard Street southbound on-ramps with HOV bypasses.

- 4. Oregon State Department of Transportation reconstruct the Columbia Slough Bridge to an eight lane structure and extend a third lane southbound through the Union Avenue interchange.
- 5. The Oregon Department of Transportation install a traffic signal at the terminus of the northbound off ramp at Portland Blvd.
- 6. The recommendations be funded as follows: transit service in Clark County-Household Utility tax, UMTA Operating funds and State Match; corridor service-UMTA Operating funds; priority treatment, slough bridge and signal Interstate funds.

- Demonstration Gall

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# PREFACE

This document contains the technical analysis which forms the basis of the summary and recommendations included in the Executive Summary of the Final Report of the Interstate Bridge Corridor Project Task Force. The Technical Analysis is expected to provide sufficient justification to local, state and federal transportation officials for the implementation of the recommended improvements. The Executive Summary was prepared to convey appropriate background information about the analysis and recommendations to local decision-makers, non-technical staffs of local agencies, news media and interested citizens.

# TECHNICAL ANALYSIS

# INTERSTATE BRIDGE CORRIDOR PROJECT FINAL REPORT

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# I INTRODUCTION

A high degree of mobility is something that has come to be expected by most persons living in the Portland-Vancouver Metropolitan Area. Mobility in our society is necessary in most cases to obtain and keep a job, to obtain an education, for shopping, to procure professional services and to engage in recreational activities. Rare is the person who can walk to his place of employment and have all the necessary services within walking distance of his or her home. In fact, persons without means of travel, other than walking, find themselves socially and economically paralyzed.

Presently, most of our transportation service is provided by the private automobile. The problems associated with a strong dependence upon the automobile are so well known that they need little restating at this point. Concerns over energy and air pollution require that our society lessen its dependence on this mode of transportation.

Certain problems exist in the Portland-Vancouver Metropolitan Area which also require reduced dependence on the private
auto. The Interstate Bridge Corridor, which contains the
Interstate 5 Freeway between downtown Portland and Vancouver,
represents one of the most severe traffic problems in the
metropolitan area.

Interstate 5 is the major north-south interstate highway on the Pacific Coast, connecting nearly all the larger west coast cities. I-5 is, thus, a major national highway corridor of significant social, economic and commercial importance.

The Portland-Vancouver Metropolitan area is composed of four counties, including three counties in Oregon and one county in Washington. Clark County, the county in Washington, is separated from the remainder of the metropolitan area by the Columbia River. Clark County has a population of 135,000, about 13% of the total urban area. Approximately 13,000 Clark County residents work on the "Portland side" of the river. Over 4,000 Oregon residents are employed in Clark County. In addition, Clark County and the remainder of the metropolitan area have significant social, economic and cultural ties. The four counties contain the Portland-Vancouver SMSA.

At this time Interstate 5 provides the only link across the Columbia River in the metropolitan area. No other river crossings exist either up or down river for about 50 miles. A second river crossing about seven miles up stream from the present Interstate Bridges is committed, but completion of this facility is not anticipated until the early 1980s.

The combination of high daily volumes of commuter traffic

Interstate 5's role as a major national highway and the absence
of any alternative river crossing within reasonable commuting
distance, creates very congested conditions in the corridor,
particularly during the peak periods. The problem is further
complicated by the fact that the Interstate Bridges are draw
bridges and must be raised several times daily to permit river
traffic to pass underneath. Until the new Interstate 205 Bridge
is completed, the traffic situation in the I-5 Corridor will
continue to deteriorate pending measures to reduce the numbers
of vehicles using the corridor. (A complete description of the

traffic conditions in the corridor is contained in the Interstate Bridge Corridor Project Phase I Report.)

To reduce auto traffic in the corridor, it has been suggested that the people moving capacity of the I-5 facility be increased. Specifically, this includes provision of priority treatment for high occupancy vehicles (buses and carpools) and creation of a unified public transit system in the corridor. Presently, transit service in the corridor is fragmented as it involves two public and two private carriers. Transit service is, therefore, very costly and time consuming for the commuter which partially explains why the modal split in the corridor is less than 1%. (Phase I Report, page 20)

A unified public transit system has been recommended to alleviate this service fragmentation. In addition, the single public system would be able to provide lower fares, better equipment, more extensive marketing and higher quality service than the private carrier now operating in the corridor.

The private carrier providing interstate service is unable to significantly improve his service because he must operate only with fare box revenues. A publicly owned carrier on the other hand, receives tax subsidies enabling the public carrier to improve service where fare box revenues will not meet costs.

Improved service within the corridor is only a partial answer. A feeder system that can serve the needs of commuters living in Clark County is essential to a successful corridor service. Presently, Clark County is served by three transit carriers, one public and two private. The public carrier (Vancouver Transit) is authorized to provide service only within

the Vancouver city limits. Vancouver Transit operates on six routes, providing basic transportation service to the city's residents. While this system interfaces with the private carrier, which presently operates the bus lines in the corridor, the relatively long headways, lack of a reduced cost transfer provision between the two lines, and the nature of the Vancouver Transit System routings make Vancouver Transit a relatively poor feeder service.

Vancouver-Portland Bus Company (a privately owned carrier) is the principle transit service operating in the corridor. Evergreen State Lines also operates in the corridor, but is not authorized to transport persons between downtown Vancouver and Portland. This carrier provides service between Camas, Washougal and Portland.

# Interstate 5 Project Work Program

To address the significant transportation problems of the Interstate Bridge Corridor, the Interstate Bridge Corridor Project was developed in late 1973. Phase I of the study suggested low capital intensive solutions to the traffic problems of this corridor. Phases II and III were to develop a longer range solution to the corridor transportation problems.

After the findings of the Phase I report were examined, it was decided to focus the remainder of the project's attention on developing a plan for a unified transit system in the corridor and in Clark County, and analyzing the impacts of a high occupancy vehicle lane in the corridor. A third element, long range planning for the corridor will be part of the Oregon Department of Transportation's work efforts. This document is the technical analysis

conducted to support the Executive Summary, a separate publication.

The technical analysis contains the essence of the work performed in the three elements of the revised work program.

Element A of the project's second phase, the transit element, addresses the designation of service area, identification of potential routes, system financing and system administration. The work program for Element A was supervised by the consolidated transportation staff of Clark County (CTS).

Element B, Priority Treatment Analysis, examined the feasibility of providing priority treatment for HOV (buses and carpools) on the FAI-5 facility. A volume analysis was conducted to determine the usage of a High Occupancy Vehicle (HOV) lane on FAI-5 between Portalnd Blvd. and Hayden Island. A survey of accident records of auto and buses was conducted to estimate possible safety consequences. An extensive quality study was made of non-traffic impacts. In addition, issues in law enforcement and carpooling were examined.

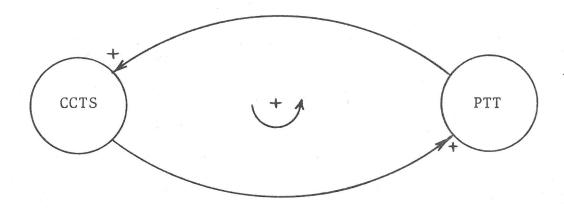
Element C, Medium Range Corridor Planning, was prepared by ODOT Planning Section and the product has been included in the appendix of this document.

The last portion of this report describes the recommendations of the project staff in regard to the development of the Unified Transit System and the priority lane analysis.

The System Effects Concept

Because of the interactions that commonly occur in natural, technical and social systems, it is appropriate to consider this characteristic in the context of the recommendations of this

document. To illustrate this point, two recommendations are utilized; namely, city-county transit system (CCTS) and priority treatment for transit (PTT), i.e., HOV lane. Increases in the CCTS ridership will tend to provide an increase in the transit ridership in the HOV lane. Increases in the PTT will tend to increase the transit ridership on the CCTS. This is illustrated in a causal loop diagram on figure I-1. This type is a positive loop in which the components build on each other.



CCTS: City-County Transit System

PTT: Priority treatment for transit

Plus signs indicate that positive changes in one component encourages positive changed in the other.

Figure I-1 City-County Transit System and Priority Treatment for Transit Causal Loop Diagram.

#### II TRANSIT FUNDING IN THE STATE OF WASHINGTON

The operation of publically owned transit systems in Washington and Oregon is regulated by state law. In addition, certain federal assistance programs make publically owned transit systems eligible for federal funds; therefore, a knowledge of restrictions placed upon local transit operating agencies by federal regulations and state law is extremely important in the development of a transit system.

This chapter contains an analysis of the legal requirements governing the establishment of planning and funding transit systems in the State of Washington. In addition, a brief overview of Oregon law relating to contracts between systems and a description of federal regulations governing assistance to transit operators is provided.

In the State of Washington, prior to 1974, only cities and King County (Seattle) had the authority to establish and provide public transit service. Cities are authorized to levy a household utility tax for the support of transit. This tax is to be levied on all households in the city and is limited to a maximum charge of \$1 per household per month. Operations of these transit systems are restricted to service within the city limits. Household utility tax collections are matched with state receipts from the motor vehicle excise tax. The state had originally been authorized to match local collections on a dollar for dollar basis. However, a total statewide limit was placed on the dollar amount which could be used to match local funds for transit service.

Thus, the motor vehicle excise tax has, to this point, provided cities with somewhat less than a full possible match.

In 1974, Washington State law was amended to permit counties to operate transit systems which could be financed through a county-wide, 3/10 of one percent general sales and use tax. The activities of such a system was to be directed by a policy board comprised of the county commissioners, the mayor of the largest city, a representative of cities with more than 5,000 population, and a mayor chosen by cities of less than 5,000 population. The transit authority could be formed by a majority vote of the county commissioners. However, funding through the 3/10 of one percent sales tax would be permitted only after its approval by a vote of the people. This legislation was not attractive to the elected officials in Clark County because Oregon (just across the river) does not have a sales tax and increases in the sales tax in Clark County are not popular.

In the 1975 legislative session, substantial modifications were made in this law. These changes modified the manner in which counties form transit agencies, create service areas, and provide financing for the transit service. The new legislation has given the cities and counties four means of funding transit systems. These include:

- Imposition of a 1/10, 2/10 or 3/10 percent general sales and use tax;
- 2. Imposition of a business and occupation tax;
- 3. Imposition of a household utility tax of up to one dollar per household per month;
- 4. A combination of 2 and 3.

While the business and occupation (B&O) tax and household utility tax (HUT) may be used in combination, the sales tax must be used alone. Imposition of any of these taxes is, of course, subject to a vote of the people. The B&O tax and the HUT are eligible for a motor vehicle excise tax match; however, the sales tax is not.

Previously, taxes for transit service had to be levied uniformly throughout an entire city or an entire county as noted above. Under the 1975 legislation, a public transit benefit area (PTBA) may be formed to provide transit service in areas larger than a city and smaller than a county. Each county is permitted to establish one PTBA. A single PTBA can be established in two or more counties. The boundaries of the benefit area must be contiguous and may not contain islands of territory not included in the PTBA.

For purposes of representation, the PTBA must include or exclude entire cities. If only a portion of a city is included, the city may not be represented on the PTBA governing body.

The means of representation on the governing body is to be determined by the jurisdictions involved in the PTBA. Single county benefit areas are limited to a nine member governing body. Multi-county areas may have up to a 15 member board. Cities not included in the transit benefit area may send a non-voting representative to the governing body to represent their interest.

Prior to the formation of a PTBA, a public transportation improvement conference is to be held. The conference shall be attended by representatives from the county and each of the cities in the county. The conference shall determine the desirability of establishing a public transportation benefit area.

After completion of the initial conference, a public hearing shall be held. Prior to the convening of the hearing, the local legislative body shall advise the county governing body of their desire to be included or excluded from transit benefit area.

Following the conclusion of the hearing, PTBA conference shall adopt a resolution fixing the boundaries of the PTBA. The decision of the conference may be reviewed by the county governing body which may modify the boundaries to include areas which will benefit from transit service and exclude areas that will not. If the county does not approve a resolution nulifying or modifying the decision of the conference, the transit benefit area will stand as approved by the conference.

Within 60 days of the establishment of the boundaries of the PTBA, the county commissioners and elected representatives of the cities within the area shall provide for selection of the governing body of the PTAB. Governing bodies shall consist of elected officials selected by and serving at the pleasure of the governing bodies of component cities within the PTBA and county commissioners of each county within the area.

Cities are given the option to withdraw from the PTBA if they act to do so by resolution within 60 days of the formation of the benefit area.

The PTBA is required to prepare a transportation plan. This plan shall include but is not limited to the following: 1. The levels of transit service that can be reasonably provided for various portions of the benefit areas; 2. The funding requirements including local tax sources, state and federal funds necessary to provide the various levels of service within the area;

3. The impact of such a transportation program on other transit systems operating within that county or adjacent counties; 4. The future enlargement of the benefit area or the consolidation of such benefit area with other transit systems.

The transit plan as developed by the PTBA shall be reviewed by the planning and community affairs agency of the State of Washington. This agency may approve the transit plan or request that the plan be modified. Plan approval is necessary for the PTBA to become eligible to receive matching funds from the state's motor vehicle excise tax.

The PTBA shall have the normal corporation and governmental powers granted to special purpose districts in the State of Washington. This includes the power to contract with other transit agencies, public or private for the purpose of providing service.

Competition between the PTBA and privately operated transit systems is forbidded by this legislation. The PTBA, however, is authorized to make special arrangements with private carriers to continue operations even after PTBA service has been established. If such arrangements can not be made, PTBA shall purchase by condemnation the private transit operation. City systems which are operating prior to the formation of the PTBA may continue to operate after the PTBA has been formed. The PTBA may acquire such systems. However it may do so only with the permisssion of the governing body of the city which owns the system.

(See ORS 267.560.) Therefore, Tri-Met may enter into a contractual arrangement with the Washington agency for purposes of providing transit service. If Tri-Met operates across state lines, however, it is necessary to obtain an operating permit from the Interstate Commerce Commission. In addition, the private carrier now providing service in the corridor must be purchased by Tri-Met. Federal regulations prohibit a public carrier, receiving federal assistance, from competing with a privately owned carrier.

Federal law provides for assistance for both operations and capital expenditures for local transit systems. The Urban Mass Transportation Administration is authorized to allocate funds to urban transit systems to pay operating costs for service improvements or expansions. A total of 1.8 million dollars is expected to be available to the Washington portion of the Portland urban area over a six year period ranging from 1975 through 1980. The city of Vancouver and Tri-Met are presently the designated recipients for this funding. The UMTA money must be matched by locally raised non-fare box revenues. This program is known as UMTA Section 5 Operating Funds. (See Federal Register, January 13, 1975, page 2534).

Assistance is also available from UMTA for purchase of capital equipment or for capital construction. UMTA will pay 80% of the cost of capital acquisition for eligible projects. These projects may include purchase of buses and other rolling stock, as well as construction of terminal facilities, shelters, exclusive rights-of-way, acquisition of private transit companies and construction of maintenance facilities.

Territory may be annexed to the PTBA by election of the persons involved in the affected territory. Annexation elections may be requested by: 1. Resolution of a PTBA; 2. By petition calling for such an election, signed by at least 4% of the qualified voters residing within the area to be annexed; 3. By resolution of a PTBA authority upon request of any city for annexation.

Counties that have established a county transportation authority or public transportation benefit area that have been established pursuant to this legislation are eligible to receive a one time advanced financial support payment from the state to assist in the development of the initial comprehensive transit plan. The support payment is limited to one dollar per person residing within each county or \$50,000, whichever is the least. Repayment of an advanced financial support payment shall be made to the public transportation account in the general fund. Such repayment shall be waived within two years of the date that the advanced payment was received if the voters in the appropriate counties or PTBA areas do not elect to levy and collect taxes provided under this legislation.

In Oregon special purpose districts for transit service may be formed in those counties comprising a standard metropolitan statistical area. Two such districts are presently operational in Oregon. These are the Lane Transit District in the Eugene-Springfield Metropolitan Area and the Tri-Met District in Portland. Oregon districts are permitted to contract with other jurisdictions to provide service outside of the transit district boundaries.

#### III TRANSIT PLANNING IN CLARK COUNTY

The transit planning process must consider a variety of factors in developing a transit system which will adequately serve the needs of the populace which the system is to serve. The factors include development of service criteria, demographic characteristics of the population to be served, types of service which can be provided, service operation, capital improvements and revenues.

This chapter provides a survey of the considerations which must be made in developing a transit system in Clark County.

This system will be the Washington portion of coordinated regional transit operations.

# Service Criteria

Criteria has been developed which links population distribution and density to levels of service. Tri-Met has developed one such set of criteria which may be applicable to providing public transit in Clark County.

The Tri-Met criteria divides the service area into three categories. These include urban areas, suburban areas and rural communities. Urban areas are those areas with over 3,200 persons per square mile or five persons per acre. Suburban areas are designed where the population is greater than 1,600 persons per square mile, but less than or equal to 3,200 persons per square mile. Rural communities are those population centers located in areas where the population does not exceed 1,600 persons per square mile. In urban areas, a bus is to be provided within 4 mile of every household. Lines operating in urban areas will provide service every 30 minutes during the midday period and at

least every 10 minutes during the peak hours. Suburban areas shall have service within ½ mile of every household. Lines will operate at least hourly during the midday period and at frequencies no greater than 15 minutes in the peak hours. In rural areas, bus service will be provided to the various community centers. Access to these lines will be supplemented by interim park and ride facilities. Service will be provided on the basis of demand.

The routing of transit lines is determined not only be the location of households (trip origins) but also by the destinations (activity centers) to which persons will be traveling. These activity centers will include:

Employment Concentrations
Central Business Districts
Industrial Facilities
Other Labor Intensive Employers
Major Medical Facilities
Shopping Centers
Schools and Colleges
Libraries
Major Recreational Centers

The major activity centers in the Vancouver Urban Area are shown on Figure III-1.

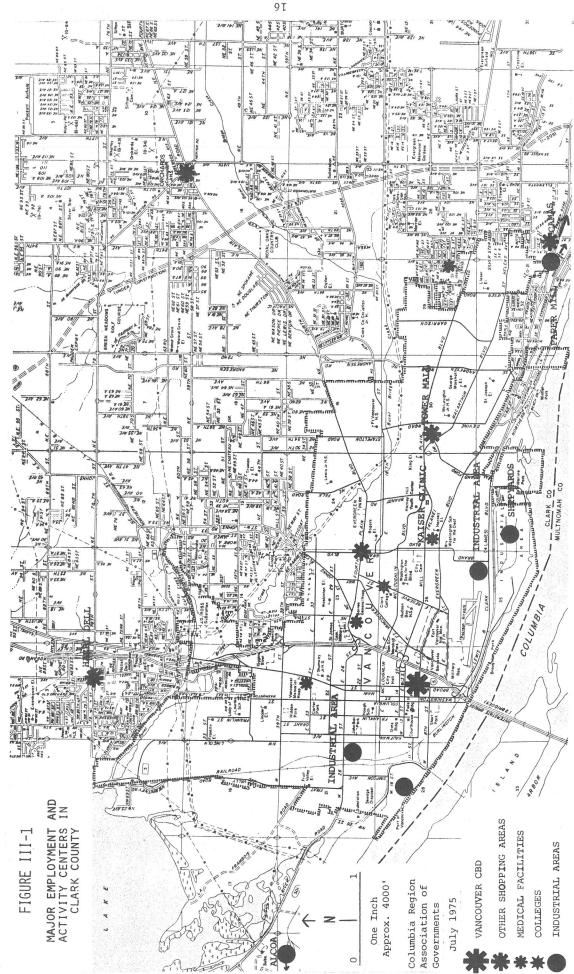
Demographic Characteristics of Clark County

Clark County is a portion of the Portland-Vancouver Standard Metropolitan Statistical Area. The county contains about 135,000 people. The 1970 employment was listed as 45,300. About 13,000 Clark County residents are employed in the Oregon portion of the metro area.

Population centers in Clark County include:

Vancouver
East Vancouver (uninc.)
Camas
Orchards (uninc.)
Hazel Dell

Battleground Ridgefield Yacolt LaCenter Washougal



Vancouver, East Vancouver, Hazel Dell and Orchards comprise the Vancouver Urban area which contains about 100,000 people, 3/4 of the county's population. The second major population area is Camas-Washougal with 11,000 people.

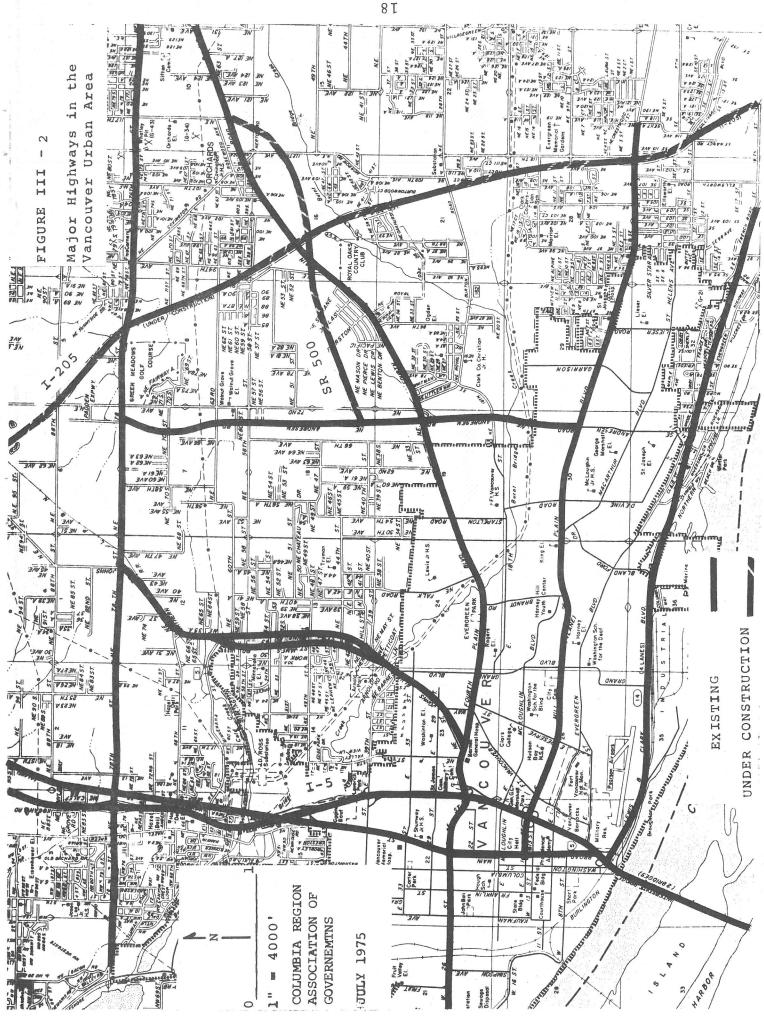
Several major arterial highways serve these populated areas in Clark County. The major north-south route is I-5, already described in Chapter 1. Other major streets in the Vancouver Urban area include Mill Plain Blvd., Fourth Plain Blvd., St. Johns-St. James Streets, Main St.-Hwy 99 and 78th Street. Two facilities (I-205 and SR 500) are under construction. The Lewis and Clark Highway, State Route 14, links downtown Vancouver with the cities of Camas and Washougal. These major transportation corridors are shown in figure III-2.

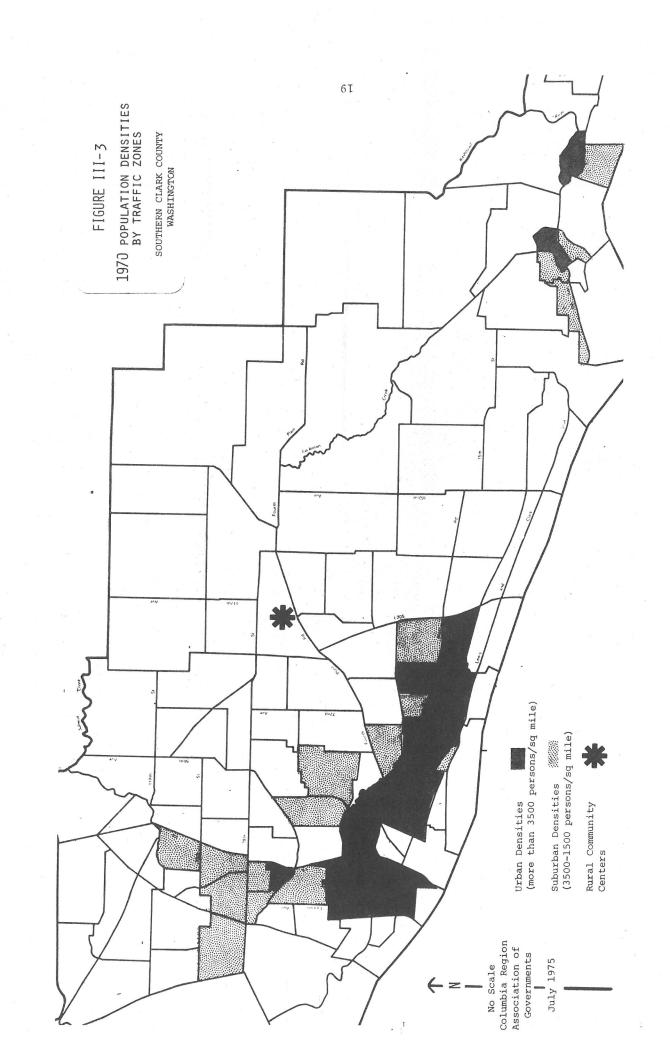
Densely populated neighborhoods in the Vancouver Urban Area tend to be located in the city center and adjacent to the major transportation corridors. Figure III-3 shows population densities in the urban area based on 1970 traffic zone statistics.

# Types of Service

Careful consideration was given to the transportation needs of Clark County as well as the transportation, social and population characteristics of the county. On the basis of these considerations, six different kinds of transit service has been identified including: Radial Service, Local Service, Corridor Service, Intercity Service, Shuttles and Special Transportation. Radial Service

Radial service is composed of those lines which operate along major arterial highways. The service begins in an outlying residential developments or community centers and terminates in Vancouver's central business district.





The purpose of this service is to provide rapid movement of people between their places of residence and the central business district. Buses will operate at selected headways throughout the day. In addition, extra buses will be added during the morning and evening peak periods to fill the demand created by persons commuting to and from work. The system should be designed so that convenient transfers can be made between this service and buses traveling to and from downtown Portland.

Park and ride stations can be useful in improving access to these lines. Also, radial service can be supplemented or "fed" by the local service described below.

# Local Service

Local service is designed to provide transportation for persons having no access to private automobiles; and, if local service is provided at sufficiently frequent intervals, it can, in some families, reduce the need for a second car.

To be effective, local service should be available within a short walking distance of the people which it serves. Therefore, transit vehicles providing local service will probably operate a certain portion of the time on local streets. It may be desirable (or even necessary) to use smaller vehicles to provide this service. The presence of large buses on local streets is likely to be objectionable to persons living in areas where the system is operated.

Local service can be provided by any one or a combination of three routing systems including:

Fixed Routes Variable Routes Dial-a-Bus Fixed routing the system presently used by Vancouver Transit is buses operating only on designated routes and adhering to a schedule.

Route deviation and dial-a-bus represent the two forms of public transportation known as "demand responsive transit". The basic element of this system is communication between the patron and the transit vehicle prior to the time the patron boards the bus. The patron makes his travel desires known to the transit company which in turn responds by routing its vehicles according to the travel demands of its riders.

Route deviation is a system where a bus is deviated from its regular route (within a given service area) to provide "doorstep" service to its patrons. The diviation is generally limited to a few blocks.

"Pure" demand responsive transportation or dial-a-bus, like the route deviation system provides doorstep service. However, no route is adhered to. There are three variations of this type of service which includes:

Many-to-one pattern - providing transport from several origins to a common destination such as a shopping center or bus terminal.

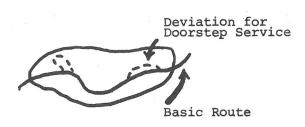
Many-to-few - providing transport from multiple origins to a few destinations, such as major activity centers or points on a downtown loop.

Many-to-many - providing transport between any origin-destination pair in the service area without limitation.

Note: These service patterns may be used, in reverse, or in combination throughout a service area or on a zonal basis depending on the characteristics of the service area. (See Demand Responsive Transit, p.3)

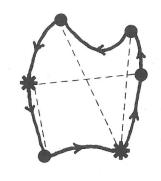
A schematic diagram of these service patterns is provided in figure III-4.

# FIGURE III-4 SERVICE PATTERNS Demand Responsive Transit

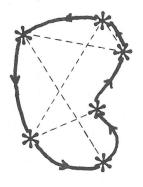


(1) Route Deviation

(2) Many-to-One



(3) Many-to-Few



(4) Many-to-Many

- Origin Point
- # Main Terminal, Transfer Point, Activity Center
- --- Desire Line
- One possible dynamic routing
- X Origin and destination pairs

Source: USDOT Demand Responsive Transit, August, 1974

Demand-responsive transit is usually activated by a patron calling the transit agency and requesting the service at a given place and time. A few demand-responsive systems are operated on a subscription basis. The patron subscribes to the service by requesting the service at a given time on a daily or otherwise basis.

Demand responsive transit has certain advantages or conventional transit. It provides more direct service, thus encouraging ridership. Demand responsive service is more flexible and can better serve the needs of persons unable to use the conventional bus service such as the elderly and the handicapped. Its main disadvantage is cost. A transit system operating both conventional and demand responsive service reported costs 14% higher for its demand responsive service. This is due to additional labor costs. Personnel are needed to receive requests for service and dispatching buses to meet these requests. In addition, little or no savings can be expected from the use of smaller vehicles. Small vehicles generally require more maintenance than their larger counterparts and are usually fueled by gasoline which is more expensive than diesel fuel.

# Corridor Service

Service in the major north-south regional transportation corridor (I-5) is the object of this service. The Interstate Bridge Corridor is presently served by a private carrier which is costly to patrons. For example, a commuter traveling from East Vancouver to Swan Island by bus will pay a total fare of \$1.40 to ride three transit systems as passengers are unable to

make free, convenient transfers from one system to the other. In addition, transit offers no time or speed advantage to commuters because buses are subject to the same congested traffic conditions that plague auto travel in the corridor.

A publicly operated corridor service linking downtown

Vancouver with Portland would alleviate these constraints to

travel by reducing fares and providing for free transfers. This

service would also utilize the proposed priority lane for high

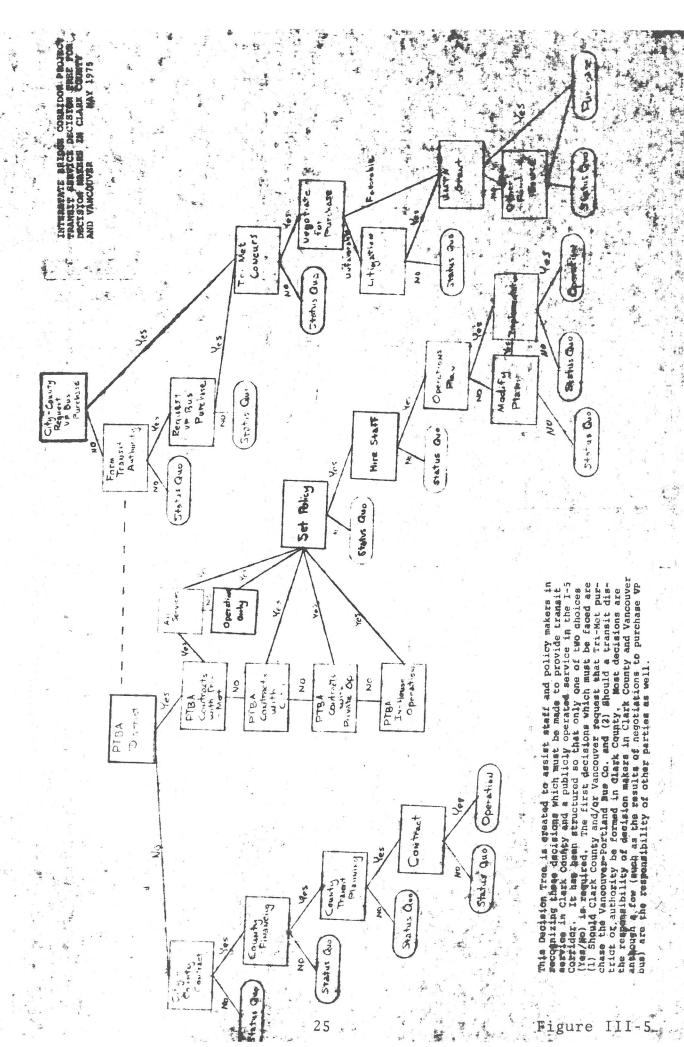
occupancy vehicles. A priority lane would enable transit vehicles

to bypass freeway congestion, thereby, obtaining total travel

times competitive with automobiles.

Provision of corridor service requires the purchase of the privately owned Vancouver-Portland Bus Company. This action has been recommended in several previous reports. It is likely that Tri-Met would be the appropriate agency to accomplish this purchase, since most of the Vancouver-Portland's routes are located in Oregon. It has been estimated that the Clark County-Vancouver share of the costs for providing this service would be approximately \$21,000 per year. One point which should be made clear is that the Tri-Met purchase of Vancouver-Portland Bus Company may be totally independent of the PTBA planning activities. This is illustrated on figure III-5.

There are six small cities in Clark County that may benefit from the provision of public transit service. Presently, the four smallest cities (Battleground, Ridgefield, Yacolt and LaCenter) are without any public transportation service. The cities of Camas and Washougal are served by a private carrier operating three round trips daily between these cities and Portland.



Intercity service would provide regular service to some or all of these cities. It is likely that the size of the Camas-Washougal area justifies reasonably frequent service intervals. The other small cities might be adequately served on a daily or even weekly basis.

The provision of intercity service should be tied to the levying of taxes in the county. Should the transit benefit area include the entire county it would probably be desirable to serve all cities.

#### Shuttles

Two kinds of shuttle service having possible application in Vancouver have been identified. These include shuttles providing home to work transportation for industrial workers and shuttles operating in and between the city's major activity centers.

The industrial shuttle which would operate only during shift changes at Clark County's major industrial areas could be operated on a subscription basis with routes according to origin points of the workers.

The second shuttle service would operate in the CBD area and between major activity centers. The downtown shuttle would provide a people moving service in the CBD and in some of the high density neighborhoods that surround this area. Another shuttle would connect major activity centers such as Clark Community College, Barnes General Hospital, the public library and the County Courthouse.

Since most industrial shift changes occur outside the normal peak period, it may be possible to utilize the equipment

that is used for radial commuter service to run the industrial shuttles. This would result in a very low operating cost for the service.

## Special Transportation

Federal transportation policies require that the needs of the elderly and handicapped be considered in the provision of public transportation services. (Section 16, UMTA Act 1964.) Legislation provides that 1½% of the federal funding provided for transit shall be used to provide special transportation services.

Special transportation is needed because persons with physical, mental or age disabilities may be unable to board a conventional bus. Some minor improvements such as handles on the outside of the bus, reserved front row seating for the elderly and easy to read bus schedules can make the transit system more accessible to a substantial number of the transit disadvantaged. However, persons unable to walk cannot board a conventional bus. Where a person is confined to a wheelchair, it becomes necessary for that person to be carried on or lifted up to the transit vehicle. A number of urban areas are presently using demand responsive buses equipped with wheelchair lifts to serve these persons.

Due to the previously mentioned federal policy and CRAG policy which requires provision for special transportation, it is imperative that special transportation provisions be considered in the design of any regional transit system.

#### Operations

The largest single aspect of any transit system is the day to day operations effort. This activity is comparable to the production function of an industry with operations being the systems largest expenditure.

Operations can be broken down into four major subcatagories including:

Operations Administration Supervision Service and Maintenance Vehicle Operation

The operations administrator performs the standard administrative tasks. These may include budgeting, planning, scheduling, contract administration, and supervision of subordinates. In smaller transit companies the operations administrator may be the general manager. In larger operations, the administrator will be a department head working under a general manager.

Supervisors are responsible for insuring that maintenance and servicing tasks are properly assigned and carried out. In addition, they may be responsible for developing and administering the maintenance and service program of the transit company.\*

Supervisors are also needed to insure that bus operators are adhering to designated routes and schedules. Like the administrative function, the number of supervisors will depend on the size of the operation. In very small companies, this function may be performed by the general manager. As the system gets larger, this function will be assigned to a greater number of persons.

<sup>\*</sup> For a complete description of the elements involved in a maintenance and service program see Mass Transit Management: A Handbook for Smaller Cities, Institute for Urban Transport, February, 1971.

Service and maintenance will be performed by teams of individuals with specialized skills in all but the smallest companies. Buses must be fueled, cleaned and maintained at regular intervals. In addition, mechanical assistance must be on hand to deal with those equipment breakdowns and accidents which invariably occur.

Vehicle operation is performed by the system's drivers.

Usually the drivers wages will be the single most costly item in the system's expenditures. Since proper (or improper) operation will go a long way toward influencing patronage and image, it is imperative that drivers be well trained and adequately supervised.

Table III-A provides a listing of those materials, equipment and labor which are necessary to maintain transit operations.

In addition, a list of related costs is also noted.

A transit system must perform other functions, in addition to operations. If the system is publicly owned, it will be necessary to work with a governing body or other public agencies to set system policy. A budget must also be prepared. Personnel policies must be drafted and administered. It is also necessary to monitor and evaluate system performance.

Most transit systems will maintain a planning function which provides eventual service improvement and expansion.

Finally, a marketing program is essential to system development. Marketing has proven its effectiveness in attracting riders to transit systems. The system should anticiapte spending about

<sup>5%</sup> of its revenues for this function.\*

\* For a discussion of marketing effectiveness see Advertising and Promotion Demonstration Project Final Report, UMTA.

TABLE III-A

## SAMPLE OPERATIONS COSTS (Dollars Per Bus Operating Hour)

| ODEDATIONS                           | TOI MET | VANCOUVER  |
|--------------------------------------|---------|------------|
| OPERATIONS                           | TRI-MET | TRANSIT    |
| Driver Labor                         | 6.46    | 4.54       |
| Maintenance Labor                    | 1.53    | 1.59       |
| Scheduleing                          | .15     | on on      |
| OPERATIONS SUPERVISION &             |         |            |
| ADMINISTRATION                       | .69     | 1.11       |
| OVERTIME                             | 1.06    | 1.05       |
| FRINGE BENEFITS                      | 1.49    | 1.42       |
| OPERATIONS MATERIALS &               |         |            |
| SUPPLIES                             | 2.19    | _3.43      |
| TOTAL OPERATIONS                     | 13.57   | 13.14      |
|                                      |         |            |
|                                      |         |            |
| ADMINISTRATION, PLANNING & MARKETING |         |            |
| Executive                            | .19     |            |
| Personnel                            | .68     |            |
| FINANCE                              | .20     | -          |
| CONTRACT ADMINISTRATION              | .25     | NOTE SALES |
| MARKETING                            | .93     |            |
| PLANNING                             | .43     | 100 mm.    |
| Insurance                            | .52     | .60        |
| Overhead                             | 000 MM  | 64         |
|                                      | 3.20    | 1.24       |
| DEPRECIATION                         | 43      | NA         |
| TOTAL COSTS                          | 17.20   | 14.38*     |

<sup>\*</sup>EXCLUDES DEPRECIATION

Planning and marketing costs are presented in Table III-B.

Capital Improvements

System capital improvements may be broken down into three general catagories including:

Rolling Stock
System Maintenance and Storage Facilities
System Anemities

It is important to keep in mind that the Urban Mass Transportation Administration will fund 80% of the cost of most capital improvements. Cost estimates (where provided) are made on the basis of total cost and are not necessarily the costs that would be incurred by the local transit agency.

Rolling stock includes all transit vehicles which are used in transporting passengers on the system. In this area, all public transit rolling stock is powered by internal combustion engines (gas or diesel). It is likely that this trend will be continued with the Clark County transit system.

Presently, a full size diesel bus costs about \$65,000. A modified bus, containing a good deal of special equipment will cost up to \$75,000. (See Passenger Transport, May 16, 1975, p.9)

Smaller demand responsive vehicles cost somewhat less. A 15 passenger radio equipped van, modified for transit service can be purchased for about \$15,000. A small radio equipped transit bus will cost up to \$41,000. (Demand Responsive Transportation, p. 39)

The number of buses needed by the system will be determined by the number of routes, frequency of service and route length. In addition, it is generally considered necessary to have a number of spare buses on hand as a contingency against equipment breakdowns. Usually one spare for every 10 buses needed for operations is considered adequate.

### Maintenance Facilities

Preventive maintenance is essential to the efficient, safe and economic operation of the transit system. To accomplish a high level of preventive and essential maintenance it is necessary to have an adequate maintenance service and storage facility.

Industry standards suggest that the transit system have facilities available for performing maintenance on about 8% of the fleet. Thus, a system having 25 buses should have two service bays. In addition, room is needed for the following functions:

\*Fueling and Service
Cleaning
Greasing
Body Repair
Painting
Machine Shop
Stocking
Storage or Parts
Offices
Storage of Coaches
Storage of Fuel
Storage of Batteries
\*Mass Transit Management, p. 155-156

Facility costs will vary depending on the size of the system. It has been estimated that a maintenance facility for 25 buses will cost about \$250,000.

## System Amenities

System amenities are those features which improve access to the transit system or make use of the system or make the system more pleasant for the patron. The most common amenities include park and ride sites, bus stations, and bus shelters.

Park and ride facilities may range in design from simple parking lots to elaborate transit stations complete with waiting rooms, comfort stations and ticket offices. In some cases, agreements may be worked out between the transit agency and

merchants, churchs or civic groups which have under utilized parking facilities. In other cases, the cost of the facilities will depend on size, elaborateness and location.

The unadopted 1990 transit plan for the Portland-Vancouver area describes eight transit stations for Clark County. These stations were to be constructed at a total cost of \$3.6 million. A scaled down version of this plan has been adopted in the Interim Transportation Plan (ITP). The ITP recommends two transit stations for Clark County. The first station would be located in downtown Vancouver. The design and precise siting of this station is under study. Another station would be constructed near I-205 in East Vancouver or in Orchards. Siting of this station is to be studied at a later date.

Bus shelters are also a useful addition to a transit system. Bus shelters not only protect passengers in inclement weather, but also serve to call attention to the system and its routings; system information such as routes, fares and schedules can be posted on the shelters. The cost of shelters averages about \$1,500 per installation.

#### System Revenues

As noted in Chapter II, Washington State law provides a number of options by which a county can fund transit service.

Table III-B lists these options and the amount of revenue which can be obtained through the various options in both a county wide and urban area district. Figures include the amount of revenue which could be raised in the cities of Camas-Washougal.

# TABLE III-B FUNDING OPTIONS

|   |     | Annual<br>Revenue |
|---|-----|-------------------|
| SALES TAX (COUNTY WIDE)   |     |                   |
| .1%   | \$  | 500,000           |
| . 2 %   | \$  | 990,000           |
| . 3%  | \$1 | ,490,000          |
|   |     |                   |
| HOUSEHOLD UTILITY TAX (\$1 per month)                                 |     |                   |
| County Wide   | \$  | 520,000           |
| Vancouver Urban Area  | \$  | 403,000           |
| Vancouver (City)  | \$  | 243,000           |
| Camas-Washougal   | \$  | 45,000            |
|   |     |                   |
| BUSINESS AND OCCUPATION TAX STATE MATCH FROM MOTOR VEHICLE EXCISE TAX | NA: |                   |
| UMTA SECTION 5 OPERATING ASSISTANCE                                   |     |                   |
| 1976  | \$  | 237,000           |
| 1977  | \$  | 308,000           |
| 1978  | \$  | 367,000           |
| 1979  | \$  | 402,000           |
| 1980  | \$  | 426,000           |

<sup>\*</sup> Estimate not available

Revenue would also be obtained through the farebox.

Virtually all planning efforts in this area have assumed a

35¢ fare. With fare discounts offered for senior citizens and children, the average fare works out to about 31¢. Farebox revenues, therefore, will depend upon the system patronage.

Patronage, in turn, depends upon the level of service. Tri-Met has computed patron estimates based on existing conditions in the urban area. These estimates and the revenue that the various levels of patronage would be expected to generate are shown on Table III-C.

TABLE III-C
RIDERSHIP AND FAREBOX REVENUE PROJECTIONS

| Accessibility to Transit | Annual Rid        | Annual Ridership        |  |  |
|--------------------------|-------------------|-------------------------|--|--|
|                          | Vancouver<br>only | Vancouver<br>Urban Area |  |  |
| As Is                    | 336,000           |                         |  |  |
| Low                      | 467,000           | 904,000                 |  |  |
| Medium                   | 652,000           | 1,263,000               |  |  |
| High                     | 1,065,000         | 2,066,000               |  |  |

## Farebox Revenues (Based on 31¢ Average Fare)

| As Is  | \$104,000  |         |
|--------|------------|---------|
| Low    | 145,000 \$ | 280,000 |
| Medium | 202,000    | 391,000 |
| High   | 330,000    | 640,000 |

NOTE:

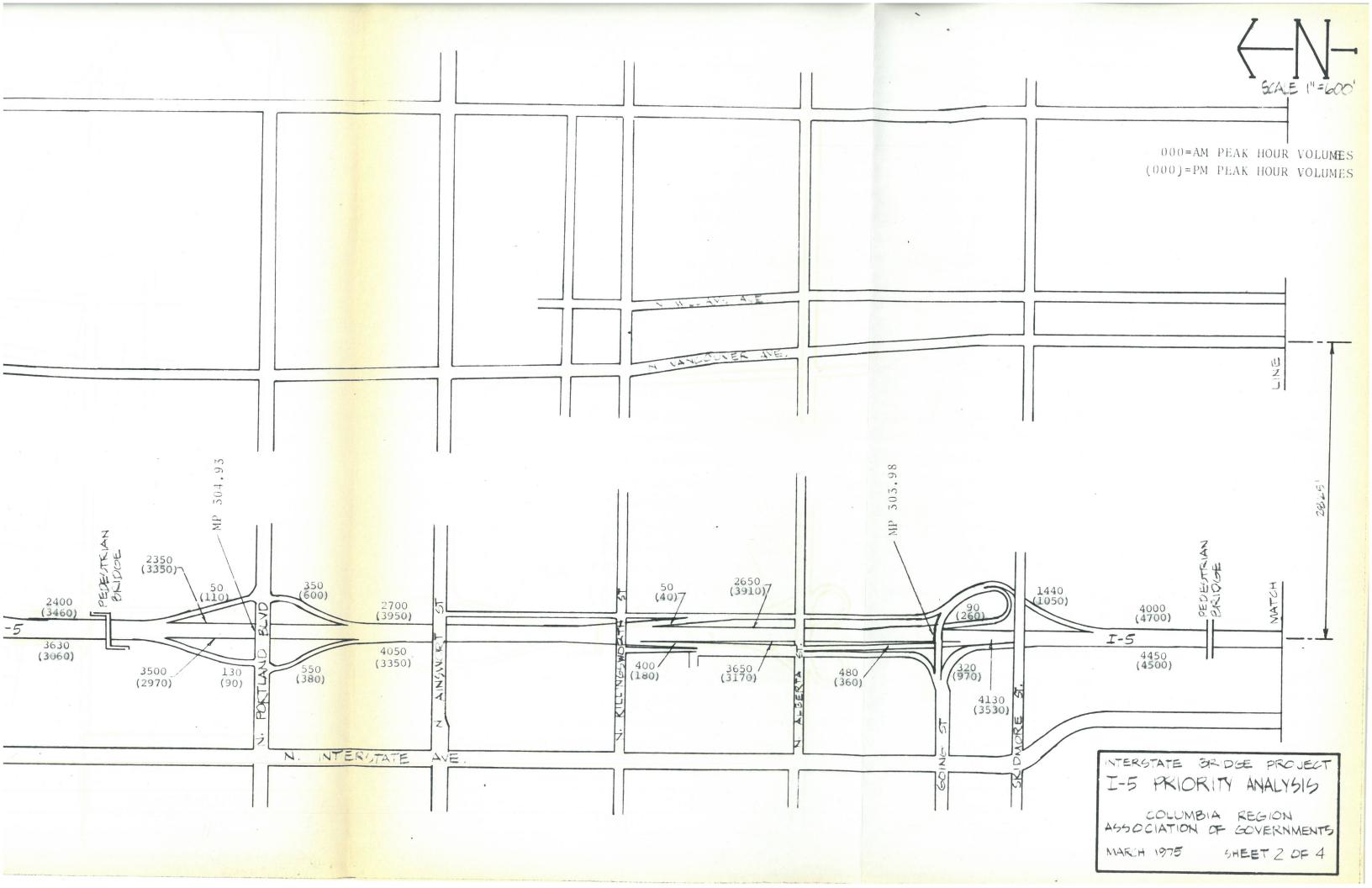
See Appendix E for definition of service levels

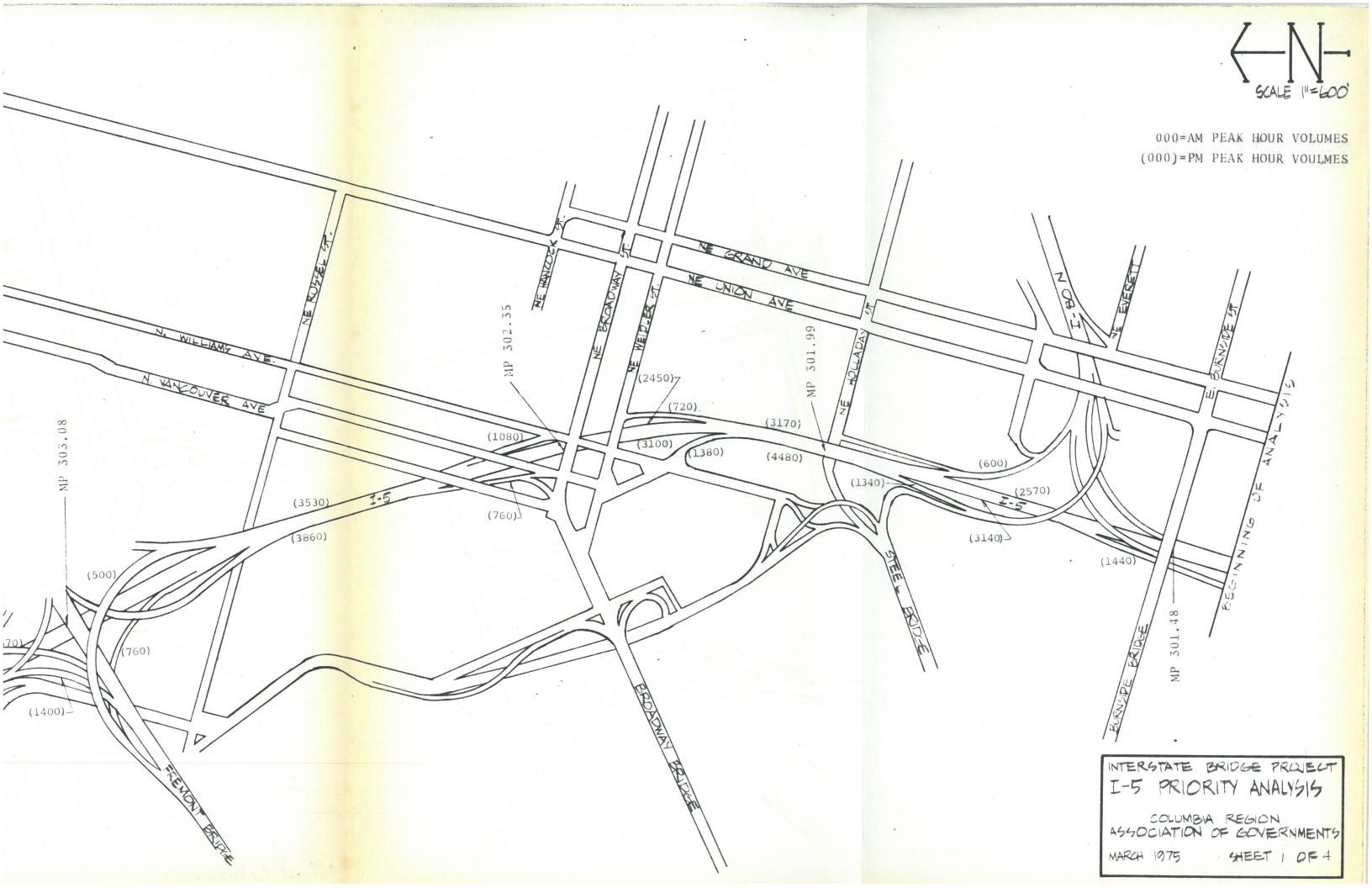
## IV. PRIORITY TREATMENT ANALYSIS

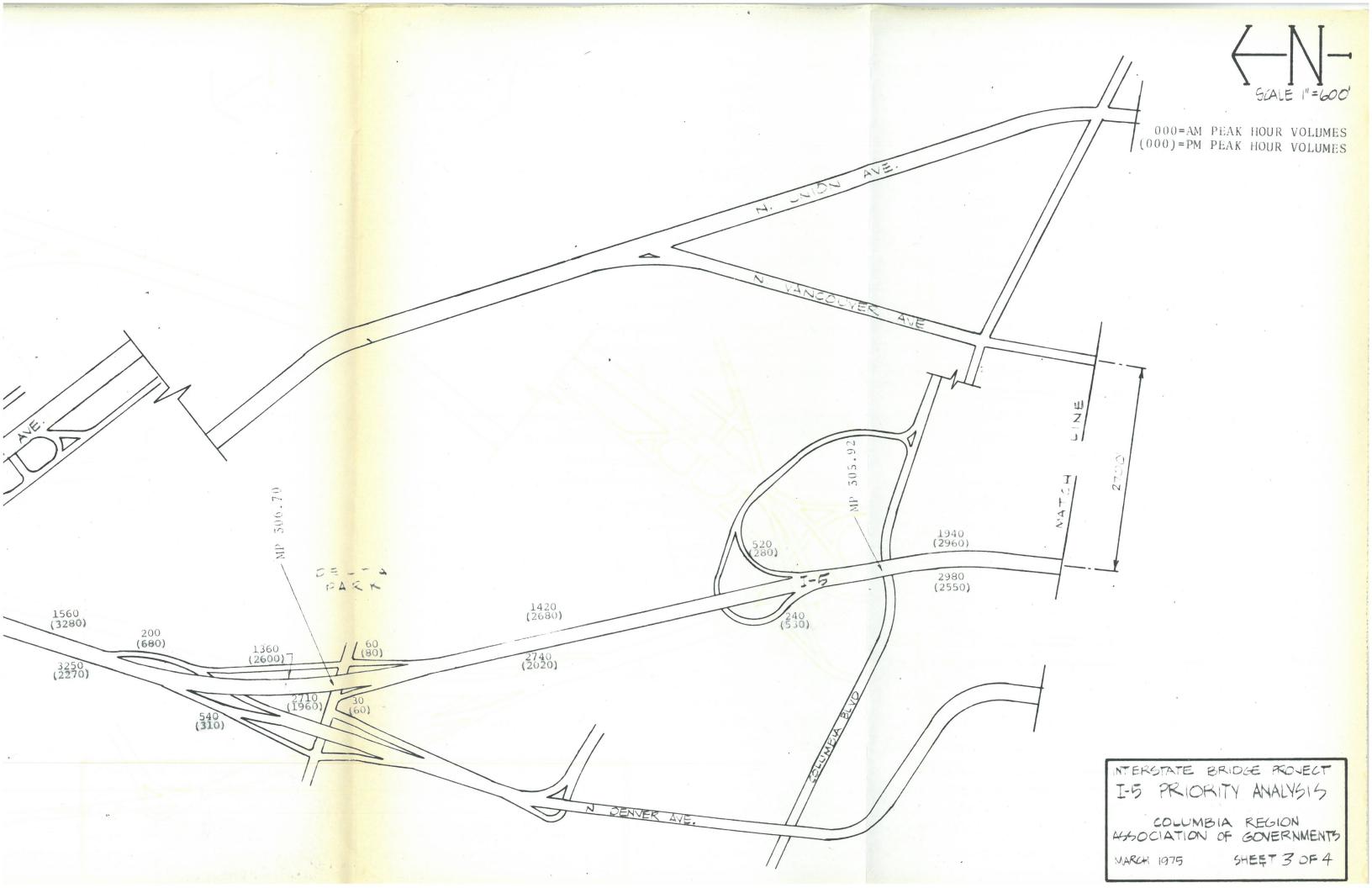
This section of the report describes the procedure utilized in the priority treatment analysis. After the prevailing conditions were determined, effort was devoted to how a high occupancy vehicle dame and ramp control measures could improve the prevailing conditions. It was learned that some other improvements would also be appropriate to consider along with these previously mentioned. Some of the other improvements that are mentioned have been previously identified and discussed in the Phase I report. After the various improvements were identified, a determination was made on the probable consequences of these improvements on the existing conditions. Some attention was given to law enforcement and carpooling issues; in addition, a number of other selected impacts were evaluated subjectively.

## Existing Conditions

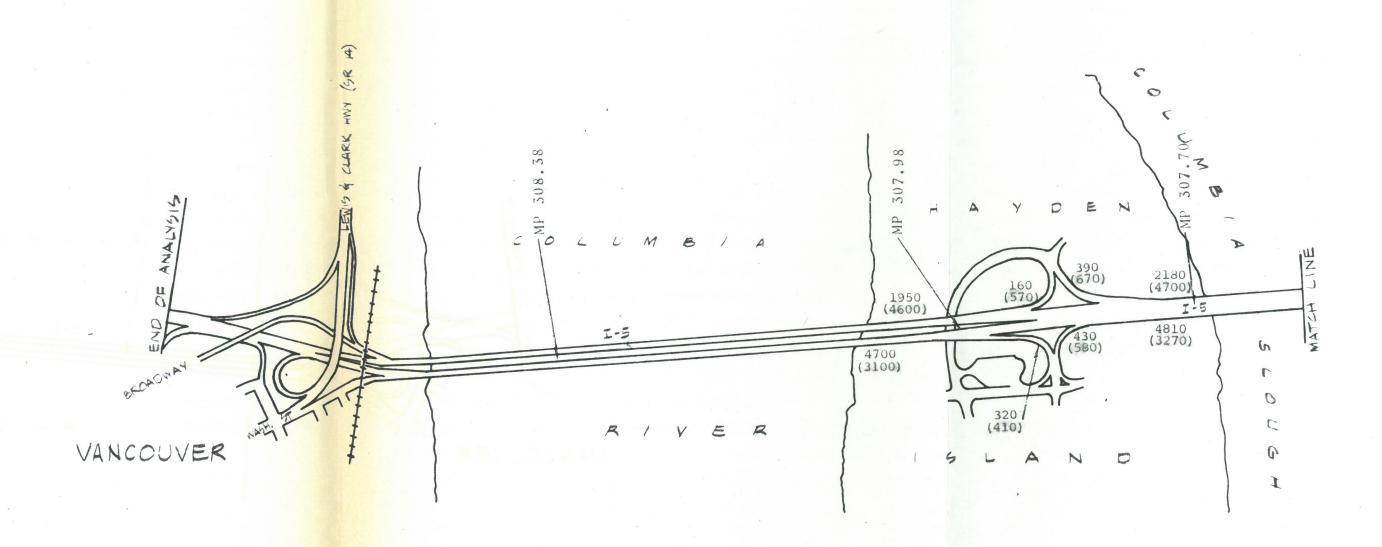
There are good records for traffic volumes on the I-5 facility at the permanent recorder count station locations of the Interstate Bridges and Ainsworth Street. To supplement this data, additional portable recorder counters were set out and manual counts obtained. The manual counts included occupancy samples in the peak and off-peak intervals. Travel time-delay studies were accomplished in the peak periods as well as numerous field trips on the part of the project staff. The traffic volumes and field trips were utilized to identify the location and intensity of the congestion problems and the travel time-delay data determined the extent to the queueing caused by the congestion.







000=AM PEAK HOUR VOLUMES (000)=PM PEAK HOUR VOLUMES



INTERSTATE BRIDGE PROJECT I-5 PRIORITY ANALYSIS

COLUMBIA REGION ASSOCIATION OF GOVERNMENTS

MARCH 1975

SHEET 4 OF 4

TABLE IV-1 PRIORITY ANALYSIS FOR I-5 BETWEEN

PORTLAND BLVD. AND COLUMBIA SLOUGH

To evaluate the impact of a HOV on the lane volumes at Portland Blvd. and Columbia Slough Objective:

| W. Utilizing Shoulder at<br>Portland Blvd. | 3(38%) 1330<br>2(41%) 1440<br>1(21%) 730                                    |   |  |  |
|--|---|---|--|--|
| W/ HOV Lane & Ramp Control                 | Pph<br>0 730<br>0 2240<br>0 1400<br>4410                                    | 0 2250<br>0 2250<br>0 1506<br>5526                      | 1360<br>2038<br>2038<br>1136<br>6572   | 1963<br>2010<br>2060<br>1090<br>7123   |
| W/ Ramp Control W/                         | vph<br>1800<br>1200<br>1200<br>1200<br>1200<br>1200<br>1200<br>1200<br>1200 | 300<br>1200 1800<br>D2 D6                               | (39%) 1760 270 (39%) 1760 (39%) 1760 (22%) 980 980 980 807                             | 1760 1660<br>1760 1700<br>980 900<br>D4 D8                                     |
| W/ HOV Lane                                | vph pph 730 5.1<br>2010 2510 14.1<br>1400 1680 1.4<br>12.1 ₹ 500 4920 1.4   | 2630 1830 2290 1800 1830 1830 4460 433 **E 5290 1.35 D2 | 230 (39%) 1770 2050 (39%) 2210 (39%) 1770 2050 (39%) 1770 2050 (39%) 1280 (22%) 1000 E | 2430(39%)1660 2010<br>2300(40%)1700 2060<br>1330(21%) 900 1090<br>6060 *D 7120 |
| LEXISTING                                  | 3 (HOV) VPh PPh<br>2 2070 2500<br>1 (41%) 1430 1740<br>F 3500 4240          | 1940  | 1920<br>1830<br>1060   | 1880<br>1790<br>1030<br>E  |
| Results: Lane Portland Blvd                | AM SB 3(H 2 2 1(4 Level of Service PM NG                                    | ervice<br>ugh   | 3(HOV)<br>3(40%)<br>2(38%)<br>Level of Service<br>PM                                   | 4 (HOV) 3 (40%) 2 (38%) 2 (38%) 1 (22%) 4 (ADTE: Vph - Vehicles per hour       |

vph - Vehicles per hour.
pph - Passengers per hour
xx) - Lane distribution of traffic volumes
\* Recommended Control

#### ASSUMPTIONS AND FOOTNOTES

#### **ASSUMPTIONS:**

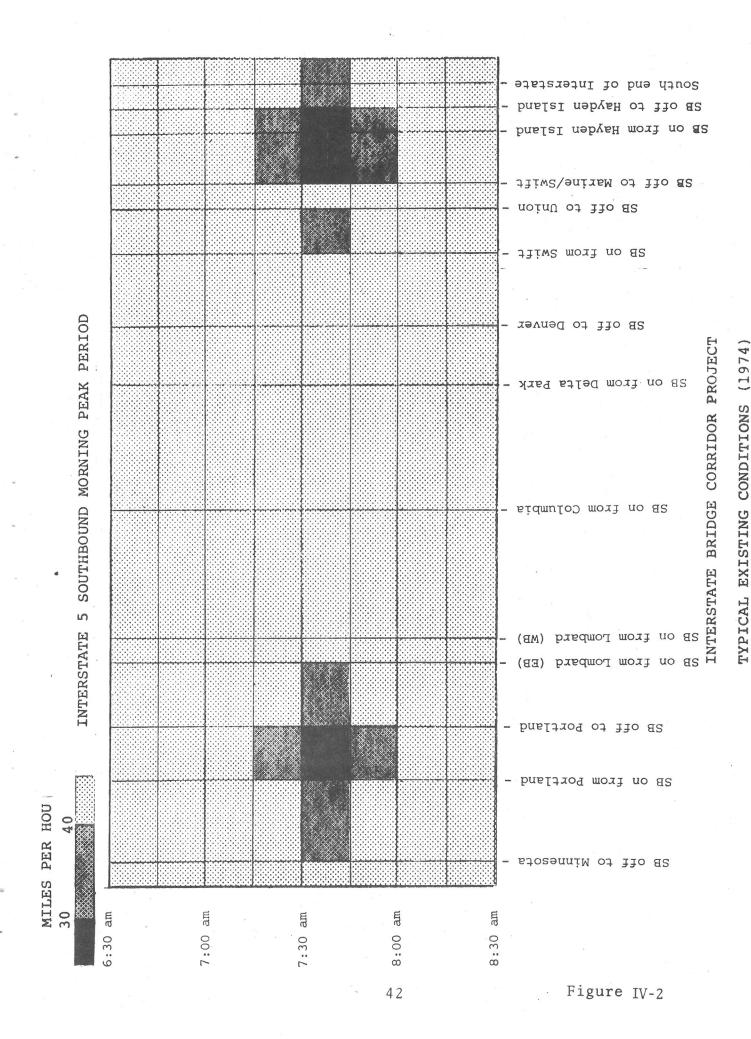
- 1. The 3 to 5% of trucks are treated as autos for occupancy computations.
- 2. The number of carpools and buses will soon double after the installation of the HOV lane (based on experience on the Oakland-Bay Bridge where carpools doubled after the installation of carpool lanes).
- 3. Traffic characteristics and models of the 1976 HCM are valid for this analysis. (Sve = 1650 vph, Svd = 1500 vph, Svc = 1350 vph)

#### FOOTNOTES:

- 1. About 500 vph (of the 650) must be diverted from Lombard St. "On" ramp to Portland Blvd. "On" ramps, etc.
- 2. About 350 vph (of the possible 440 vph) must be diverted from Williams Ave. and Going St. to other facilities.
- 3. About 310 vph at Hayden Island or Vancouver must be quened and held until volume reduces.
- 4. About 200 vph at Delta Park or Union Ave. must be quened and held until volume reduces.
- 5. About 410 vph must be diverted as in note 1.
- 6. About 50 vph must be diverted as in note 2.
- 7. About 40 vph must be quened as in note 3.
- 8. No ramp control required.

BETWEEN AINSWORTH STREET AND HAYDEN ISLAND

Figure IV-1



three or more persons. It was also assumed that the number of carpools and transit ridership doubled with the installation of the HOV lane. This was based on the experience of the Oakland-Bay Bridge for carpools and Tri-Met fare reduction for transit ridership.

The assumption that the transit ridership would double after the improvements recommended herein is substantiated in the following ways:

- 1. The ridership on several Tri-Met lines (Forest Grove/Hillsboro/Beaverton, Sherwood/Tigard, and Somerset West) increased about 1.56 times six months after the 35¢ flat fare structure went into effect.
- 2. There will be a city-county tranti system in Washington with a free transfer for interstate passengers.
- 3. Fuel costs will continue to increase for the immediate present.

It was estimated that the northbound HOV lane in the evening peak hour will service approximatley 1470 passengers per hour at Portland Blvd and 1960 at the Columbia Slough Bridge. Respectively, the morning peak volumes in the southbound direction were expected to be 730 and 1360. It is apparent that the 730 passengers per hour (90 vehicles per hour) is substantially underutilized; therefore other improvements have been considered for the southbound direction. These other improvements include using the southbound shoulder under the Portland Blvd structure as a third lane while the other possibility was ramp control which is discussed in the next section.

Some preliminary analysis was made at the initiation and termination of the northbound HOV lane to determine that it appeared possible.

One staff conclusion of the capacity analysis, supported by ODOT planning section, was that the Columbia Slough Bridge needs to be widened to eight lanes. Northbound on I-5 an HOV should be added to the existing two lanes and a fourth lane added at Union Avenue and dropped a Hayden Island off-ramp. Southbound the fourth lane should be added at Hayden Island on ramp and dropped at Union Ave with the third lane dropping at Denver Street.

If the use of a HOV eliminates the shoulder, which is much less expensive than providing an HOV with a shoulder, pull outs should be provided at appropriate intervals for emergency parking.

## Ramp Control

Ramp control and metering systems have been previously (Phase I Report) treated and the various modes of control identified and descrived. For this analysis "capacity-demand" mode was considered the most appropriate control for this situation. It was selected because (1) the "on" ramp acceleration lanes were not seriously deficient, (2) it is traffic responsive and will respond to varying flow conditions and (3) it is less expensive than more sophisticated modes. Ramp metering usually is applied to a facility which has a parallel alternative for those who are directed from the freeway. This is illustrated on figure IV-3. Ramp control of motorists crossing the Slough or Interstate Bridge does not have an alternate route. Isolated applications are rare and should be used with caution because of effects elsewhere on the system.

Possible northbound ramp control sites include:

|  | PM Pk. HR.                | *               |
|--|---------------------------|-----------------|
| Williams Ave NB "On" Going St NB "On" Portland Blvd NB "On" Denver Ave NB "On" | 1080<br>260<br>110<br>680 | 357<br>85<br>44 |
|  | 7                         | 486             |

Of the northbound peak hour approximately 486 vehicles subject to diversion, about 440 vehicles per hour may be diverted to reduce the demand at Portland Blvd. This would reduce traffic demand to approximatley 2910 vehicles per hour. The actual diversion was based on level of service "D" (15 00 vehicles per hour per lane). The freeway volume in excess of 1500 vehicles per hour per lane was diverted to other arterials up to a maximum diversion of 440 vehicles per hour. Since the PM peak hour volume was 3350 vehicles per hour at Portland Blvd., 350 vehicles per hour were diverted to other facilities.

Southbound ramp control at Lombard Street could improve the level of service at Portland Blvd. which has been shown as deficient on figure VI-2. In fact, the Lombard southbound "on" ramps could be closed since Portland Blvd is near and has sufficient capacity to accommodate the additional traffic. However, 500 vehicles per hour of the total 650 vehicles per hour is the number which will need to be diverted. There is sufficient capacity on the local arterials (Interstate and Vancouver Ave's) to accommodate this diverted traffic. It would be appropriate, however, to consider the renovation of some of the existing signals

<sup>\*</sup>Indicates divertable trips. There are trips which have an alternative to the freeway. There are no divertable trips to Hayden Island and Vancouver because all traffic must use the Slough Bridge.

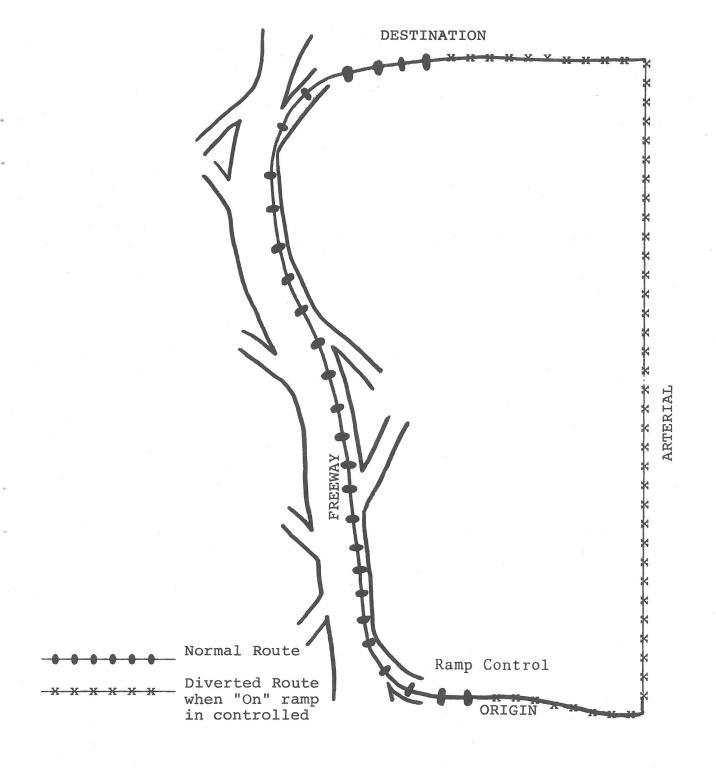


FIGURE IV-3PRINCIPLE OF TRIP DIVERSION RESULTING FROM RAMP CONTROL

and the installation of new ones at the Portland Blvd interchange and left turn channelization on Interstate Avenue, Lombard Street and Portland Blvd.

Even though the HOV lane northbound and widening south-bound will improve the traffic flow, there is reason for concern on Hayden Island. There have been land development proposals which will generate more trips (see project staff report on "Traffic Impact of Tomahawk Island Proposed Development" December, 1974). Presently, there is a comprehensive plan for development on the Island. In view of this interest and the obvious economic incentive for additional development, some measure to maintain reasonable level of service on Interstate 5 appears desirable. Consideration of ramp control at the northbound and southbound on-ramps with HOV bypasses which would tend to maintain a sufficient level of service. While this application of ramp control would not have an alternate route for motorists, there would exist an alternate; this alternate is to utilize carpooling or transit.

The consequences of not using ramp control as discussed herein is (1) to stop all traffic generating development on the Island, (2) tolerance addition congestion on Interstate 5, and (3) construct a bridge from Hayden Island to Marine Drive or Swift Avenue.

Law Enforcement Control System

A very important component of an efficient and effective functioning transportation system is that of enforcement. Effective law enforcement measures can improve the efficiency of a transportation system particularly when accidents or other incidents occur which may adversely affect the traffic flow.

This section addresses the law enforcement issue by describing lane delineation and signing controls. In addition, the concept of closed circuit TV is also discussed.

Whenever preferential treatment is permitted for a portion of the traffic flow, enforcement can be difficult. By designating one lane to be used by buses and carpools there will be a tendency for those motorists who do not qualify for the priority treatment to violate the control. Experience elsewhere has indicated that there will be a large number of violations when any priority treatment is first established. However, through effective law enforcement measures conformance to this practive will be established.

The utilization of this kind of priority treatment is unique to the Portland region. It may be referred to as a free access high occupancy vehicle lane and differs from previous applications elsewhere in the country in that traffic cones of some other means of separation from the normal traffic flow is provided. Such application permits access to and from the HOV lane only at selected opportunities. The application in this instance will be to provide ingress and egress continually throughout the duration of the HOV lane on I-5. This type of design tends to increase the confusion weaving and conflicts which will occur with vehicles entering and leaving the HOV lane. Legally this can be reduced or eliminated by the utilization of a double solid white line where travel in the same direction is permitted, however crossing

49

BETWEEN AINSWORTH STREET AND HAYDEN ISLAND

TYPICAL CONDITIONS EXPECTED WITH RECOMMENDED IMPROVEMENTS

TYPICAL CONDITIONS EXPECTED WITH RECOMMENDED IMPROVEMENTS

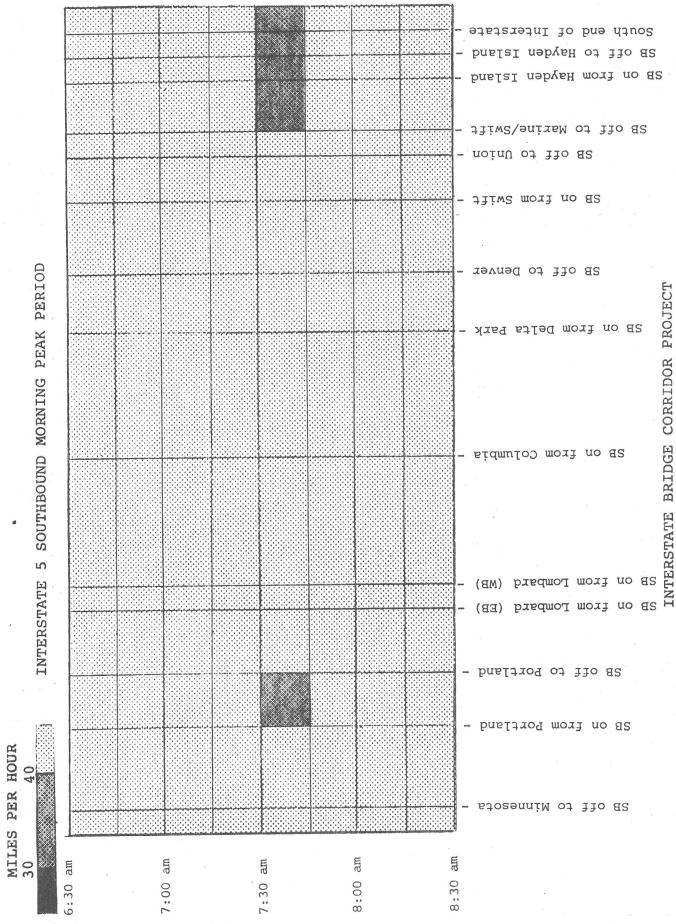


Figure IV-4

the line is prohibited. At frequent locations one of the double white lines can be discontinued. The interpretation of this is that crossing this line requires care.

In addition to the lane markings, considerable signing would not only be appropriate but necessary to convey information to the motorist about the use of the HOV lane. Since the operation of an HOV lane is not common, special attention to signing would be appropriate. Extra effort and care is proper whenever the motorist are required to cope with new and/or unusual control measures.

To assist the law enforcement effort, since numerous violators are expected, closed circut television (CCTV) surveillance was explored and appeared to have considerable merit. The CCTV could monitor the lane for violators, patrol units could be noticed and warnings issued to violators when they leave the HOV lane. Also, dynamic message signs could emphasize the lane control as violators approach the signs. Another benefit, identified and discussed in the Phaæ I Report, is the detection of accidents, disabled vehicles or other incidents which may intensify congestion. If the time of incident detection can be reduced to essentially nothing, the emergency equipment can arrive at the scene in much less time because the queues will still relatively small. Presently in peak hours the queues often extend for miles before the incident is reported to the law enforcement agency.

#### Carpooling Considerations

In recent years the practice of carpooling has received considerable attention and emphasis in the attempt to increase

the efficiency and passenger capacity of transportation facilities. On a nationwide basis, approximately 30% of all work trips occur in carpools. The definition of a carpool is two or more persons per vehicle. On Interstate 5 during the peak period carpools represent approximatley 22% of all work trips. In a report by the US Department of Transportation on carpool incentives and opportunities it was estimated that a 10% increase in the number of commuters per car will result in a decrease in vehicle mileage up to 60% without increasing the number of vehicles. Subsequently, rather small changes in the automobile occupancy can have substantial improvements in the savings of fuel and at the same time increase the capacity of the transportation system. It has been further determined that carpoolers can save approximately \$200 to \$850 per year depending upon the number of persons participating in the carpool.

Some have been concerned with possible determental affects on transit ridership by marketing and emphasising carpools. However, actual experience has shown that affective carpool programs have had no significant adverse impacts on transit ridership. It has been learned further that the most affective and successful carpooling activities have occurred when employers have provided incentives such as discriminatory parking in favor of carpoolers. The most promising and innovative concept in this area has been that of Vanpooling. This consists of the company providing a 10 to 12 passenger van which is funded by the participants at no cost to the company.

Throughout the nation, in general, it has been reported that too few urbanized areas have systematically pursued priority

treatment for HOV. It appeared that many state and local transportation officials have not given sufficient emphasis to this matter. In fact, in some cases they have even resisted such measures. This action is not new because often new or innovative concepts meet some institutional resistance. Institutional momentum changes are required to use new ideas. In the CRAG region it is fortunate that the state and local officials have voiced support for the use of priority treatment for high occupancy vehicles.

Generally, carpooling and vanpooling can develop into a significant component of the transportation system. One of the major difficulties in the development of transportation facilities is the matter of designing for peak period utilization. The actual demand on the transportation facilities during the peak periods is much greater than the off peak. By utilizing a substantial number of carpools and vanpools it is possible to accommodate the peak period demand without having to invest in additional rolling stock for transit service and additional roadway capacity. This concept is illustrated in figure IV-4. Much of the cost of public transportation is to provide rolling stock to serve the peak periods and yet the same rolling stock must be idol through the balance of the day. In addition, and perhaps more importantly, additional drivers are required for the peak period and with the present labor contracts the work day must extend beyond the peak periods. Carpools and vanpools could reduce the amount of rolling stock that is required and the number of drivers required during the peak period.

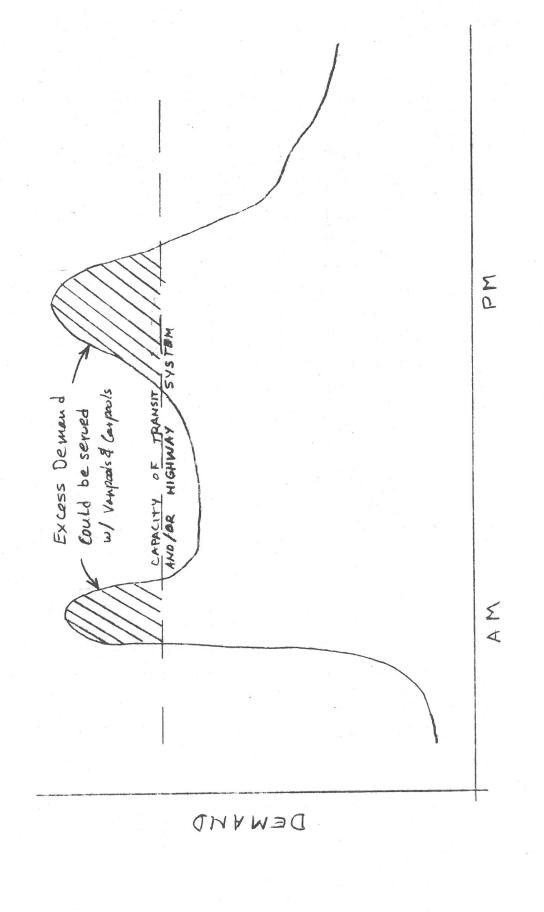


FIGURE IN - 4 PROVIDING FOR EXCESS DEMINO ON TRANSPORTATION

#### Cost Considerations

An important issue in any decision making process is, of course, the cost. No solution merits serious consideration unless it is within the realm of financial capability of the implementing agency. For this reason the improvements studied in the project work tasks have been compared with other alternatives and appear as follows:

| Alternative |   |        | <b>Estimate</b> |  |
|-------------|---|--------|-----------------|--|
| 1.          | Exclusive HOV Roadway &                         |        | \$35 Million    |  |
| 2.          | Exclusive HOV Lane with state Roadway Standards | Inter- | 16 Million      |  |
| 3.          | Exclusive HOV Lane with Substandard Geometrics  |        | 1.3 Million     |  |

An apparent conclusion of the cost estimates suggest that the improvements evaluated herein are extremely reasonable financially when compared with other alternatives which may be considered for Interstate 5 corridor.

## Selected Impacts of Improvements

Whenever changes are made in one aspect or component of a system, changes usually occur elsewhere. So likewise the improvements in this section are expected to cause changes in aspects other than the more obvious. A number of the less obvious aspects have been identified and subjectively evaluated. This evaluation is summarized on table IV-2.

TABLE IV-2 SELECTED IMPACTS OF A PRIORITY LANE FOR HIGH OCCUPANCY VEHICLES IN THE I-5 CORRIDOR

| HICLES IN THE I-5 CORRIDOR  | ANTICIPATED RESULT | Improvement in region's air   | Reduction in per capita energy consumption  | Increase employment in Portland $_{ m CBD}^{}$   | The economic viability of downtown<br>Vancouver will increase  | Land values in areas surrounding the<br>transit station will increase | Development in Clark County will increase until land costs are driven up |  |
|-----------------------------|--------------------|---|---|--|--|---|--|--|
| FOR HIGH OCCUPANCY VEHICLES | AREA<br>IMPACTED   | Regional and Corridor Airshed   | Corridor and<br>Clark County  | Portland CBD   | Vancouver CBD  | Vancouver CBD   | Developable land<br>in Clark County                                      |  |
| CT'S OF A PRIORITY LANE     | MEASUREMENT        | Amount of gases,<br>particles etc, in<br>the air  | Gasoline<br>Consumption   | CBD Employment   | Employment Retail<br>Sales   | Land Values   | Increased Clark Co.<br>Population and work<br>force                      |  |
| TABLE IV-Z SELECTED IMPACTS | CAUSE OF<br>IMPACT | Reduce the number of auto's emitting pollutants by providing incentives to increase vehicle occupancy | Reduce consumption of fossil fuels (i.e. gasoline) by encouraging use of more efficient means of transportation | Encourage additional employment in the Portland CBD by improving commuter transportation access to the CBD | Improved transport-<br>ation access to Van-<br>couver CBD resulting<br>in increased economic<br>activity | Increased activity<br>around transit<br>station                       | Improved Transport-<br>ation opportunities<br>to employment<br>centers   |  |
| T.A.                        | FACTOR             | Air Quality   | Conservation  | Land Use: Downtown Portland  | Land Use: Downtown Vancouver   | Land Use:<br>Vancouver Transit Station                                | ) Land Use:<br>Clark County  |  |
| 1                           | 1                  | 1)  | 5   | €<br>56  | (4)  | 2)  | (9   |  |

|   | ANTICIPATED RESULT | Reduction in corridor's accident rate and improved response to incidents. Some adverse affect may result because of elimination of shoulder.                              | Increase in noise levels in corridor may result               | Increased taxes in Clark County and in Tri-Met District                 | Slight increase in area employment $^2$ | Slight increase in area employment $^2$  | Slight decline in sales relating to motor fuel and related services and projects | Slight decline in parking spaces in Portland CBD as land is converted to other uses. Increasing demand for parking in and around Vancouver CBD as park and ride increases |   |
|---|--------------------|---|---|---|---|--|--|---|---|
|   | AREA<br>IMPACTED   | I-5 Freeway   | Primary impact along<br>corridor                              | Clark County Tri<br>County Metropolitan<br>transit district             | SMSA Work Force                         | SMSA Work Force                          | Clark County   | Vancouver and<br>Portland CBD's   |   |
|   | MEASUREMENT        | the Accident Rates: 4 utos in Auto-1.2A/MPM due to Bus14A/MPM of (A/MPM-Accidents per Earlier million vehicle miles) incidentsResponse time for inthe free- cidents       | Decibels  | Public Expenditures   | Employment                              | Employment                               | Retail Sales   | Parking Rates   |   |
|   | CAUSE OF<br>IMPACT | Reduction in the reliance of autos in the corridor due to encouragement of express bus. Earlier detection of incidents occurring on the freeway. Elimination of shoulder. | More buses will be using the corridor increasing noise levels | Additional subsidy<br>needed to operate<br>transit buses in<br>corridor | Construction of priority lane           | Operation and<br>maintenance of<br>buses | Slightly lower<br>demand for gas-<br>oline and related<br>products               | Lower demand for parking in Portland CBD: Increased demand in Vancouver CBD   |   |
| 4 | FACTOR<br>IMPACTED | 7) Safety   | 8) Noise<br>Pollution   | 9) Public<br>Finance<br>5   | 10) Employment (short term)             | 11) Employment (long term)               | 12) Commerce   | 13) Parking   | l |

- Additional economic impacts (such as #4) likely to result in overall employment increases. H
- Increased employment in Portland CBD plus increased development in Clark County may encourage more downtown workers to live in Clark County, thus further complicating transportation in the I-5 Corridor until property values rise sufficiently to curb development. 2
- Care should be taken in the design of the termination of priority lanes to assure that there is adequate opportunity Since highway design standards encourages merging from the right in contrast to the left, perhaps, it would be advantageous to merge normal traffic into the HOV lane at the terminous on Hayden Island. 3
- MPM/ this was determined by converting the 1.8 A/MVM accident rate assuming a daily occupancy rate of 1.5 passengers One of the measures of highway safety is that of traffic accidents. The accident rate on I-5 was found to be 1.2 A/ rate for buses operating on lines utilizing freeways and expressways was .14 A/MPM. From this data it is apparent A similar accident rate for Tri-Met buses were found to be 2.82 A/MPM for all lines. The accident that any incentive to utilize transit - such as a HOV lane - would tend to improve the level of safety. 4.

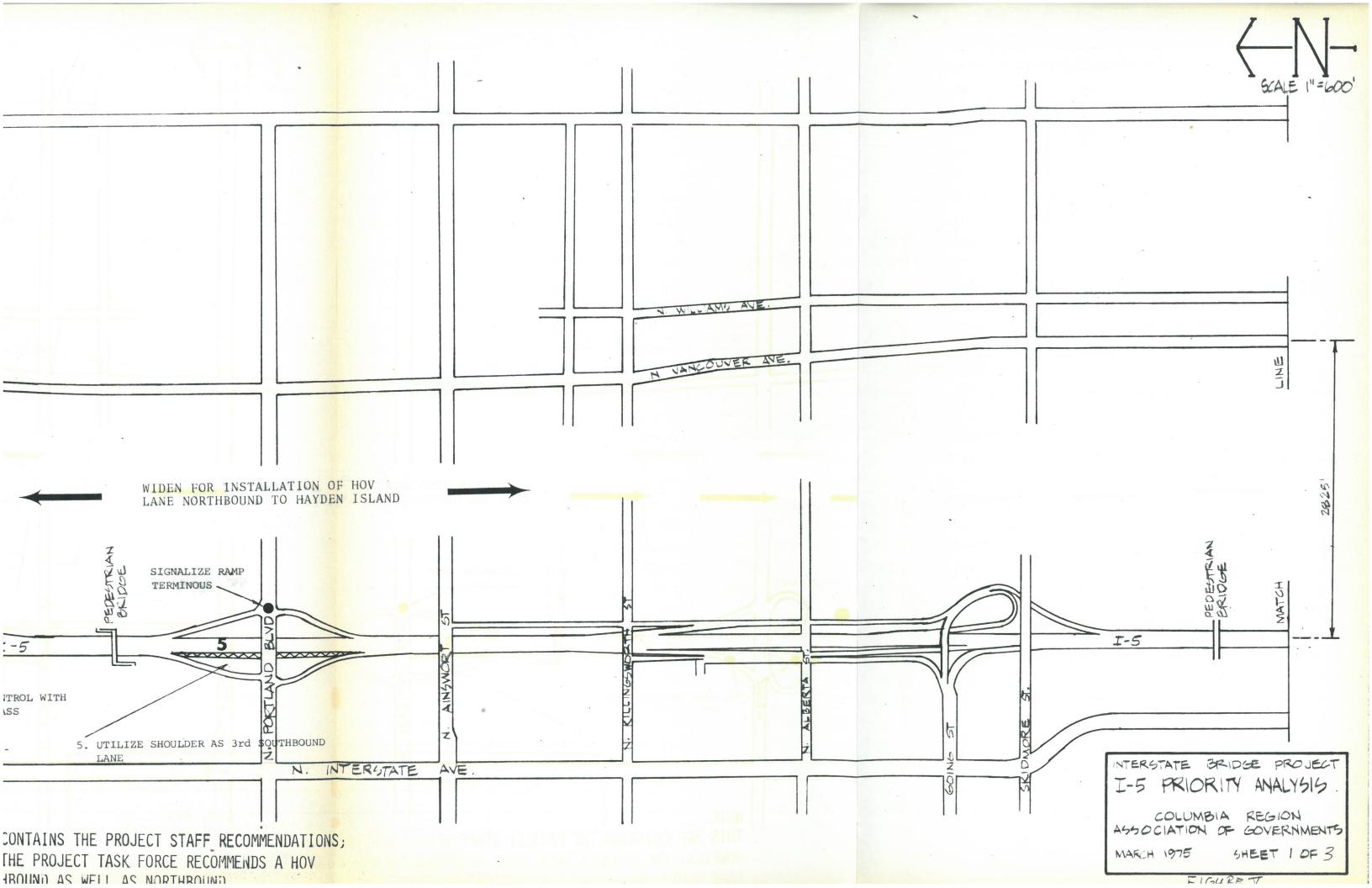
#### V A SYSTEM OF RECOMMENDATIONS

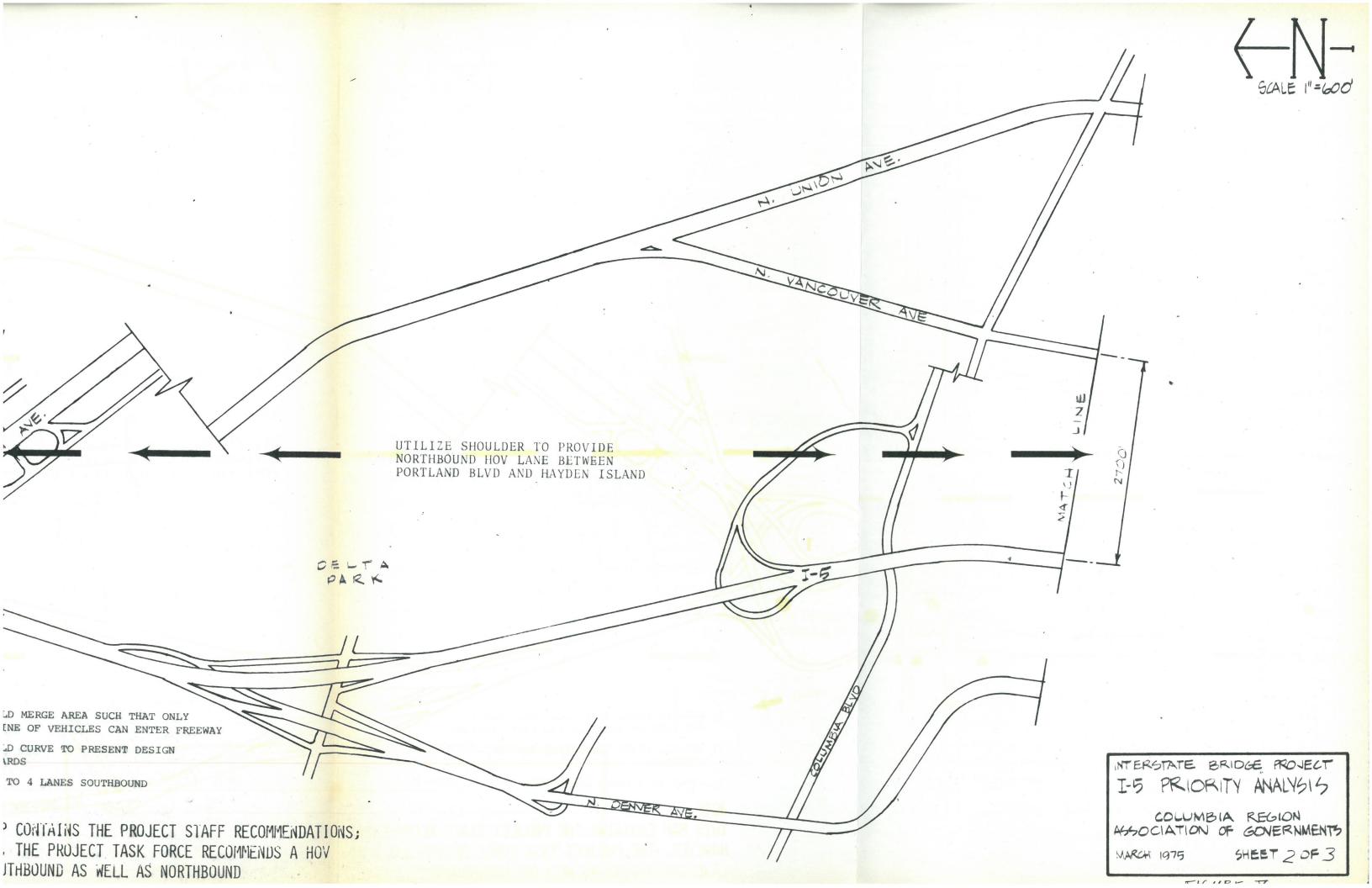
This analysis of transportation problems in the Interstate Bridge Corridor has resulted in the development of a number of immediate to short-range, low-cost improvements in the existing transportation system which are recommended for implementation in the corridor. Since this project is oriented towards physical action, the implementing agency represented on the Project Task Force actively pursue the implementation of these needed improvements in the corridor.

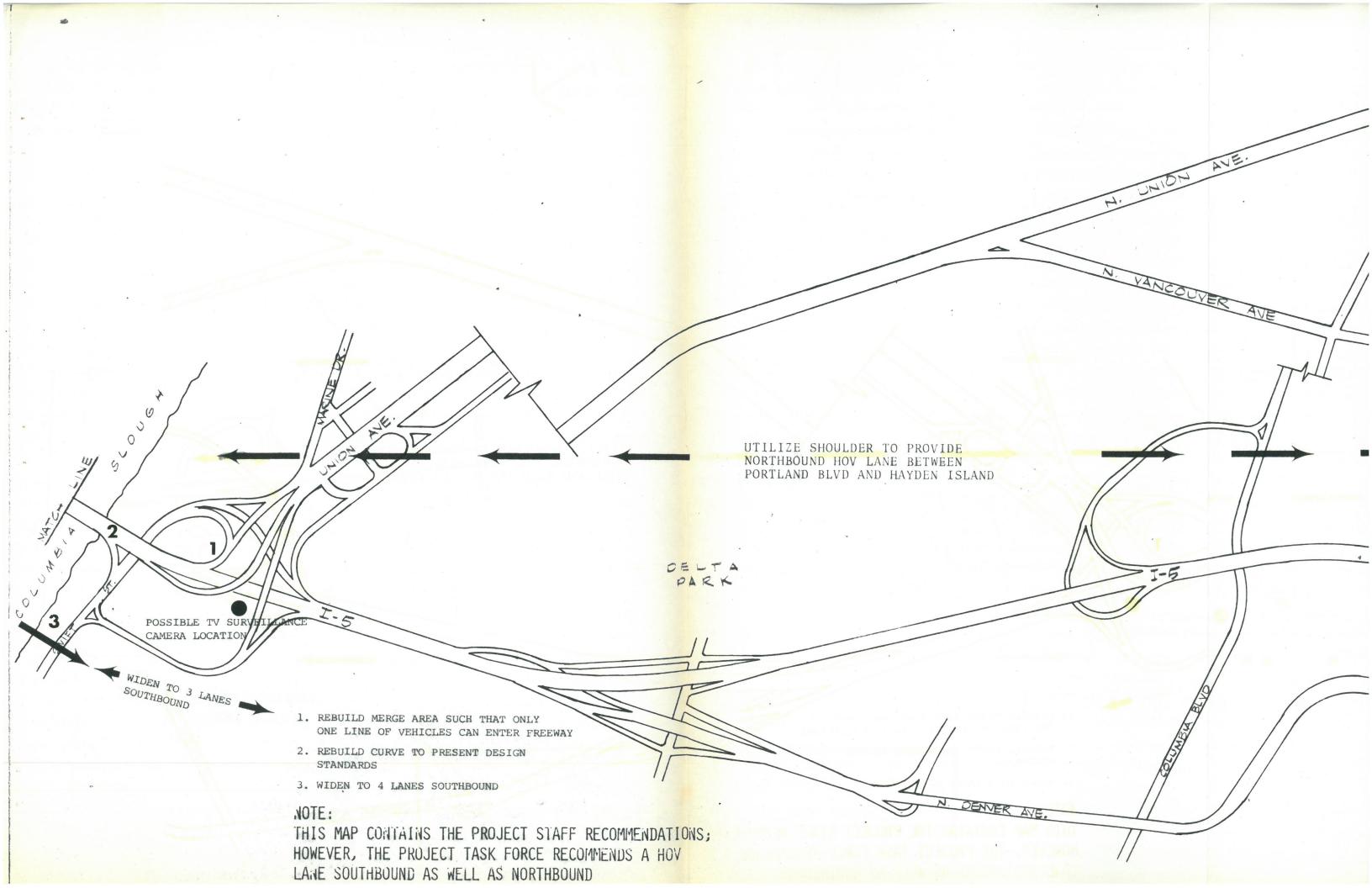
These improvements include transit planning activities in the corridor and Clark County, priority treatment for HOV and traffic operational improvements. Some of these recommendations will be familiar in as much as they were recommended in the Phase I report.

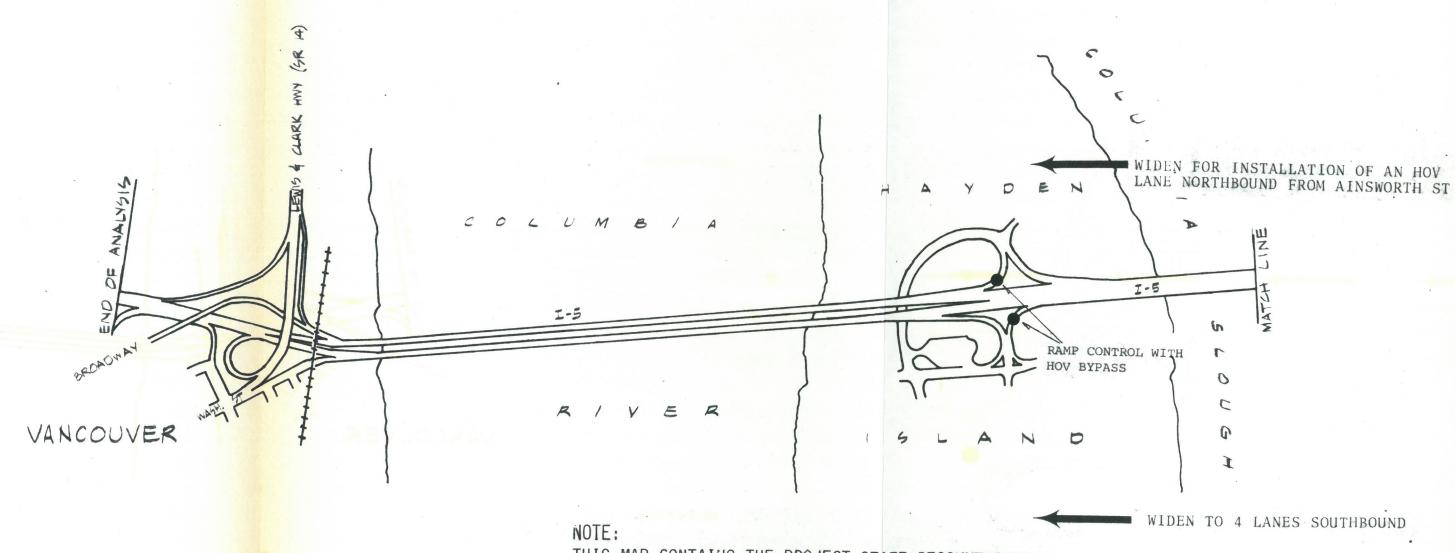
- Clark County and City elected officials immediately call and conduct a public transportation improvement conference.
- 2. City and County elected officials immediately request Tri-Met to purchase V-P Bus Co. This action is estimated to cost the City and County no more than \$21,000 per year for the present level of service existing in the corridor. It is recommended that these agencies share in this cost in proportion of the origin of the trips of those using the service. The decision tree illustrated that the public transportation conference activities can be independent of the Tri-Met purchase of V-P Bus Co.
- 3. Oregon State Department of Transportation install priority treatment measures as follows (figure V ):
  - a. Add a lane in both directions between Ainsworth Street and Hayden Island for HOV.

- b. Ramp control at Hayden Island on-ramps with bypasses for HOV.
- c. In cooperation with the Oregon State Police install and operate a closed circut TV surveillance system.
- NOTE: The findings the project staff indicated that an HOV lane in the southbound direction is probably not justified and recommends that the shoulder under the Portland Blvd structure by use of a southbound lane or install a ramp control device at Lombard Street southbound on-ramps.
- 4. Oregon State Department of Transportation reconstruct the Columbia Slough Bridge to an eight lane structure and extend a third lane southbound through the Union Avenue interchange (figure V ).
- 5. The Oregon Department of Transportation should install a traffic signal at the terminus of the northbound off ramp at Portland Blvd (figure V ).
- 6. The recommendations be funded as follows: transit service in Clark County-Household Utility tax, UMTA Operating funds and state match; corridor service-UMTA Operating funds; priority treatment, slough bridge and signal-Interstate funds.









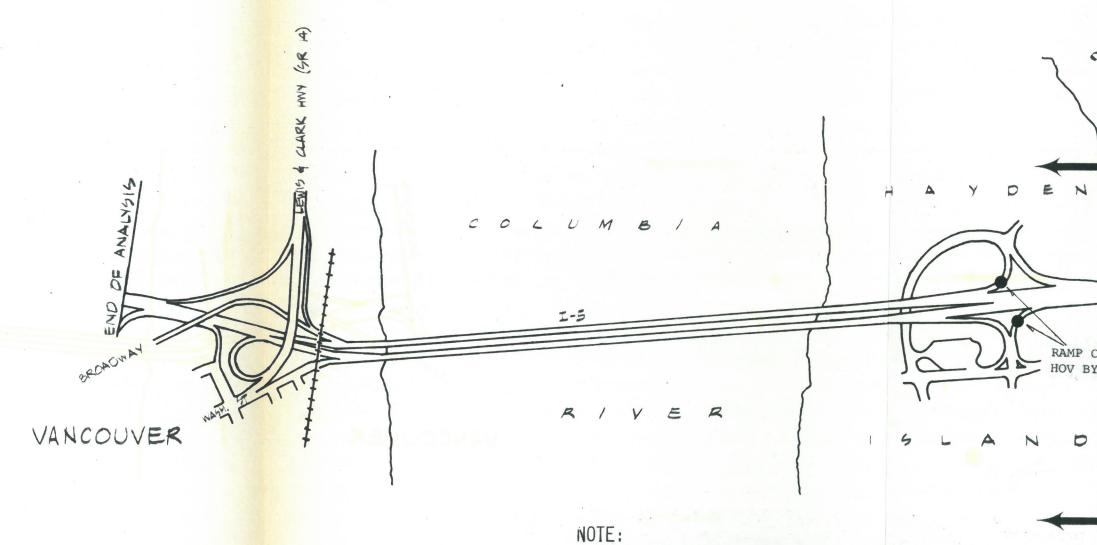
THIS MAP CONTAINS THE PROJECT STAFF RECOMMENDATIONS; HOWEVER, THE PROJECT TASK FORCE RECOMMENDS A HOV LANE SOUTHBOUND AS WELL AS NORTHBOUND

I-5 PRIORITY ANALYSIS

COLUMBIA REGION ASSOCIATION OF GOVERNMENTS

MARCH 1975

SHEET 3 OF 3



THIS MAP CONTAINS THE PROJECT STAFF RECOMMENDATIONS; HOWEVER, THE PROJECT TASK FORCE RECOMMENDS A HOV LAME SOUTHBOUND AS WELL AS NORTHBOUND

APPENDICES

APPENDIX A

DATA FOR HIGH OCCUPANCY VEHICLE

#### LANE ANALYSIS

|   | PORTLAND BLVD |       | COLUMBIA | SLOUGH |                              |
|---|---------------|-------|----------|--------|------------------------------|
|   | AM            | PM    | AM       | PM     |                              |
| Occupancy for all autos <sup>1</sup> (persons/auto)         | 1.21          | 1.33  | 1.21     | 1.29   |                              |
| Occupancy for autos with more than 3 persons (persons/auto) | 3.50          | 3.50  | 3.50     | 3.50   |                              |
| Occupancy for autos with less than 2 persons (persons/auto) | 1.20          | 1.25  | 1.16     | 1.21   |                              |
|   |               |       |          |        |                              |
| Autos with one person                                       | 81.9%         | 75.6% | 79.5%    | 71.8%  |                              |
| Autos with two persons                                      | 15.3%         | 19.3% | 19.3%    | 23.7%  |                              |
| Carpools (more than 3 persons) without HOV Lane             | 2.8%          | 9.0%  | 5.6%     | 9.4%   |                              |
| Carpools (more than 3 persons) with HOV Lane <sup>2</sup>   | 5.6%          | 18.0% | 11.2%    | 18.8%  |                              |
| Bus Volumes without HOV Lane                                | 4             | 4     | 4        | 4      |                              |
| Bus Volumes with HOV Lane <sup>3</sup>                      | 8             | 8     | 8        | 8      |                              |
| Occupancy of Buses <sup>4</sup>                             | 52            | 52    | 52       | 52     | torn derivative and a series |

<sup>1.</sup> The 3 to 5% trucks were treated as autos.

<sup>2.</sup> Carpools are doubled base on experience on Bay Bridge in California.

<sup>3.</sup> Number of buses are doubled based on 1) Tri-Met fare reduction, 2) Tri-Met operates corridor service and, 3) There is an urban public transit system in Clark County with free transfer arrangement with Tri-Met.

<sup>4.</sup> Source of bus occupancy: Vancouver-Portland Bus Company.

#### APPENDIX B

This contains extracts from an analysis conducted by Oregon State Department of Transportation - Planning Section in Salem, Oregon.

# DEPARTMENT OF TRANSPORTATION Planning Section Plan Analysis Unit

#### I-5 Corridor Going Street-Interstate Bridge

## Introduction

Pursuing the I-5 Study further, this report focuses more directly on specific improvements to I-5 north of Delta Park Interchange and at the Portland Boulevard Interchange. Several design changes are suggested to improve traffic operations on the subject sections of I-5. Southbound and northbound analyses were separated and the findings are summarized below:

## I-5 Southbound

- a) Widen the Oregon Slough Bridge section to four lanes.
- b) Improve the curvature of the existing Swift Road offramp or combine the Union-Swift off ramps into a single two-lane off-ramp.
- c) Improve I-5 to three lanes at the Portland Boulevard Interchange.

# I-5 Northbound

- a) Widen the Oregon Slough Bridge section to four lanes.
- b) Close the Union-Swift off-ramp to eliminate the short weave section north of the Delta Park Interchange.
- c) Improve I-5 between the Denver Avenue and Union-Swift entrance ramps by providing an extended acceleration lane for Denver Avenue on-ramp traffic.
- d) Improve I-5 to three lanes at the Portland Boulevard Interchange.

## Analysis

The emphasis of this analysis is to study today's traffic problems and determine appropriate solutions. The 1974 peak hour volumes were used for this study. Assuming traffic growth will be regulated by the Interstate Bridges, future traffic projections were not used in the analysis. Shortly, an updated version of future projections will be available reflecting I-205 traffic diversion, current land use plans, and higher transit estimates.

Figure I illustrates the peaking characteristics of traffic flow on the Interstate Bridges. The southbound bridge peaks from 7:00 to 8:00 AM while the northbound bridge peaks from 4:00 to 5:00 PM. Solutions to relieve the peak hour delays and congestion existing today on the Minnesota Freeway will be discussed.

# Summary

This analysis assumes the automobile will continue to be the predominant mode of travel in the subject I-5 corridor. With this assumption, emphasis was directed at the highway system's capability to satisfy the demands. Ramp metering systems or busway proposals to modify auto travel demand were not considered in this study.

The completion date of I-205 (1980-1981) is expected to provide considerable relief on I-5. In the meantime, traffic generated from new developments at Hayden Island and Rivergate Industrial Park are anticipated to further strain congested conditions.already existing in the study

<sup>\*</sup> Manual counts by the Washington State Department of Highways in 1972 indicated that the evening peak hour on the Interstate Bridge was 4:30 to 5:30 PM.

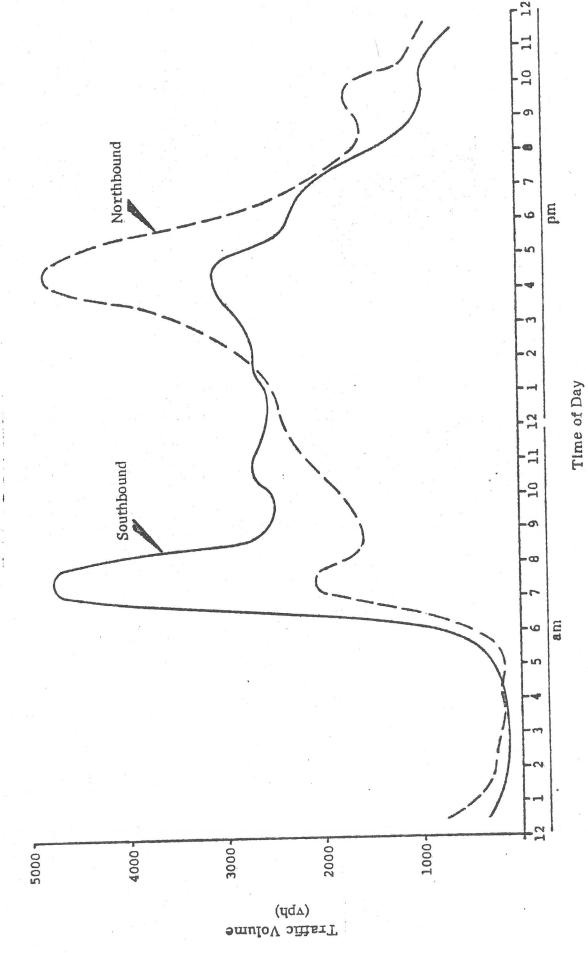
corridor. Therefore, the "worst case" traffic condition would exist just prior to the completion of I-205.

With the proposed improvements, traffic operations during the "worst case" condition should be acceptable. It is estimated that peak hour traffic growth is limited to 300 to 600 vehicles due to the capacity limitations of the Interstate Bridges. The proposed improvements would provide the needed capacity to handle this traffic growth at a tolerable level of service.

Jim Branch Bob Jurica 6-30-75

INTERSTATE BRIDGE

Weekday Traffic Distribution (Nov. 26, 1974)



#### APPENDIX C

This contains sketches of the representation of the Initiation and Terminiation of the Northbound High Occupancy Vehicle Lane. It is not intended to be a recommended design but only illustrates that the exclusive lane is plausible.

Vicinity of Minsworth St Intration of HOV Long

Posters Bles HON

IBCP CRAG 6/75

Hayden Island Termination of HOV LAME HON 70

Exact Location of Terminas can be determined by lawa Distribution Analysis ("Lane Stack" Diagram).

> CRAG 6/75 IBCP.

#### APPENDIX D

#### COSTS FOR CORRIDOR SERVICE

The following is a computation of the estimated costs for corridor service, as well as an estimate of the subsidy needed from Vancouver and Clark County. The service provides 34 daily trips, including extra peak period service, 27 Saturday trips and 12 Sunday trips.

This is essentially a continuation of the present level of service provided by Vancouver-Portland Bus Co., with the addition of evening service. The lines operate at ½ hour headways 6:30am-6:00pm, 10 minute headways during the peak and hourly headways after 6pm. All Sunday service runs on hourly headways. Additional assumptions are made as follows:

- Tri-Met operates this service
- Tri-Met's current operating costs are used
- The fare is 35¢ with reduced fares for children and senior citizens. This produces an average fare of 31¢
- Patronage on this line will double over a period of a year as a result of reduced fares and free transfers
- Peak service operates on a self sustaining basis (no subsidy needed)
- Clark County and Vancouver will subsidize the service operated beyond Jantzen Beach

| Tri-Met Cost per Bus Hour    | \$ 17.77 |
|------------------------------|----------|
| Tri-Met Cost per Bus Mile    | 1.21     |
| Average Bus Speed            | 14.7 mph |
| Number of Daily Trips        | 34       |
| Less peak trips              | -13      |
| Off peak daily trips         | 21       |
| Saturday trips               | 27       |
| Sunday trips                 | 12       |
| Estimated 2 Way Trip Length  | 15 miles |
| Estimated 2 Way running time | 1 hour   |

| Estimated | 2 Way | distance   | fron | n         |
|-----------|-------|------------|------|-----------|
| Jantzen   | Beach | n to Downt | cown | Vancouver |

4 miles

Estimated running time from Jantzen
Beach to Downtown Vancouver

16 minutes

Current average Vancouver-Portland off peak patronage (including weekends)

320\*

COSTS (off peak including weekends)

On hourly basis

 $((21 \times \$17.77) \ 225) + ((39 \times \$17.77) \ 52)$ 

52) = \$131,000

On mileage basis

Average

$$\frac{\$131,000 + 134,000}{2} = \$132,500$$

#### Revenues

| Average weekday off peak patronage (at the beginning of Tri-Met service) | 3    | 20      |
|--|------|---------|
| Average daily off peak revenues $.31 \times 320$                         | \$   | 99.00   |
| Annual revenue at initial patronage level                                | \$36 | ,000.00 |
| Average weekday off peak patronage (after 1 year)                        | 6    | 40      |
| Average daily off peak revenues .31 x 640                                | \$   | 198.00  |
| Annual revenue after 1 year  | \$71 | ,000.00 |
| Estimated first year revenue $\frac{71,000 + 36,000}{2}$                 | \$53 | ,000.00 |
| Z  |      |         |

<sup>\*</sup> This includes 285 weekday passengers 600 Saturday passengers 200 Sunday passengers

# Subsidy

| Costs   | \$132,500.00 |
|---|--------------|
| Less Revenues   | \$-53,000.00 |
| Subsidy Needed  | \$ 79,500.00 |
| Portion of route attrubutable to Clark County/<br>Vancouver |              |
| 4 ÷ 15 = 27%  |              |
| 16 min ÷ 60 min = 27%                                       | 27%          |
| Subsidy attributable to Clark County                        |              |
| (.27 x \$48,000)  | \$ 21,000.00 |
| Subsidy attributable to Tri-Met (\$79,500 - \$21,000)       | \$ 58,000.00 |

\* This includes 285 weekday passengers 600 Saturday passengers 200 Sunday passengers

Estimates provided by Vancouver-Portland Bus Company

# V RECOMMENDATIONS

This analysis of transportation problems in the Interstate Bridge Corridor has resulted in the development of a number of immediate to short-range, low-cost improvements in the existing transportation system which are recommended for implementation in the corridor. Since this project is oriented towards physical action, the implementing agency represented on the Project Task Force actively pursue the implementation of these needed improvements in the corridor.

These improvements include transit planning activities in the corridor and Clark County, priority treatment for HOV, and traffic operational improvements.

Some of these recommendations will be familiar in as much as they were recommended in the Phase I report.

- 1. Clark County and City elected officials immediately call and conduct a public transportation improvement conference.
- 2. City and County elected officials immediately request TriMet to purchase V-P Bus Co. This action is estimated to
  cost the City and County no more than \$30,000 per year
  for the present level of service existing in the corridor.
  It is recommended that these agencies share in this cost
  in proportion to the origin of the trips of those using
  the service. The decision tree illustrates that the public transportation
  conference activities can be independent of the Tri-Met purchase of V-P Bus Co.
- Priority treatment recommendations for ODOT implementation (figure \_)
  - a. The installation of an HOV lane northbound and a TV surveillance system between Ainsworth St. and Hayden Island. (HOV being defined as 3 or more persons per vehicle.)
  - b. Install ramp control signals at Hayden Island onramps with bypasses for vehicles with more than two persons therein.
  - c. Utilize the southbound shoulder under the Portland Blvd. structure.

Install ramp control signals at the Lombard St. southbound on-ramps, with the bypasses for Hov.

4. ODOT install a traffic signal at the terminus of the north-bound off ramp at Portland Blvd (see figure \_\_).

